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Gifted Children

Seattle Public Schools *Photo by Royal Crooks*

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Gifted Children

Their Psychology and Education

MAURICE F. FREEHILL
Western Washington College of Education

THE CHARLES G. REIGNER

EDUCATIONAL READING ROOM
PRINCETON THEOLOGICAL SEMINARY

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Gifted Children

1

Stewardship of the Gifted

In time of great difficulty or serious threat, armies press into service their ablest generals; ball clubs, their finest pitchers; and industries, their shrewdest managers. In the frightening times after Hiroshima, society might have been expected to search out and use the best leadership and the best intelligence available. Dependence on scientific invention and international understanding dramatized the need for intelligent leadership and for insights of high order. The launching of mechanical satellites publicized what should be seen as a central principle: Society is ever dependent on the insight and the foresight of its ablest citizens.

An effective society encourages the maximum development of various abilities and provides for the comparatively uninhibited interchange of both ideas and services. In a democracy, progress comes through the efforts of all but it follows the plans or ideas of some.

The social need for intelligence

Man is eternally short of his goal. He searches for better food, greater warmth, surer love, more power, deeper understanding, and longer life. In each of these struggles he is particularly dependent on intelligence. Animals adapt themselves to specific environments and become bound to them. Man adapts the environment to himself. He conquers and alters his surroundings. In this, he succeeds more by cleverness than by strength or courage. Each new conquest or extension of space makes the world more intricate and creates new demands for intelligence and invention.

The launching of two Russian space satellites in late 1957 produced a clamor for technicians and scientists. These incidents sharpened concerns which had been developing for more than a decade. A struggle for scientific and technological leadership began in earnest during and following World War II. In 1954, Dael Wolfle, now executive officer of the American Association for the Advancement of Science, wrote *America's Resources of Specialized Talent.*[1] This was a report for the Commission on Human Resources and Advanced Training. It revealed shortages of highly trained personnel in many fields as an aspect of increasing specialization in the modern world. The publication of this report marked the beginning of public concern for the supply of intellectual resources. This concern produced a comparatively widespread crusade for the effective discovery and use of intelligence in a complex and technical culture.

Military events highlighted and accelerated a growing requirement for intellectual competence and extended education. Some increase would normally accompany growing urbanization and developing technology. By 1957, trained manpower resources reached approximately 22 per cent of the total work force without satisfying the demand. The trend promises to continue with the work force in the United States going from seventy-three to eighty-seven million between 1960 and 1970, an increase of 20 per cent. Bureau of Labor Statistics' estimates show that professional and technical workers will increase from 6.5 million in 1957 to 10.5 million in 1970, or 60 per cent. The projected rate for this group is more than double the general projection and once and a half as large as the projection for sales workers. In the same period a decline is anticipated in raw numbers of unskilled and farm labor.

The manpower situation reinforces pressures for educational adjustments, especially in the field of science. The focus on science results in part from the fact that the modern scientist plays a highly strategic role in military affairs. Some of the enthusiasm comes from the fact that scientific specialties are themselves attractive and interesting. This is a world of antibiotics and jet propulsion, a world which has been profoundly changed through the applications of science and scientific thought. Interest in this scientific world is natural and almost inevitable.

Industry offered inducements of salary, prestige and good working conditions to college graduates in chemical, electrical and other modern specialties.[2] Military and industrial groups established special educational opportunities and science education became an instrument of national policy. The National Science Foundation and the National Defense Education Act supported science majors and the improvement of science teaching. The inducements of scholarships, summer jobs and stipends were augmented by science fiction, itinerant science displays, the Science Clubs of America and the National Science Talent Search. Hundreds of colleges undertook the special preparation of science teachers for the lower schools. Advanced schools found it possible to select the career scientist more carefully and train him more rigorously. Particularly enthusiastic attention was directed to very select students capable of major contributions. The Massachusetts Institute of Technology and others directed effort toward training "better—not more—students." [3]

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[1] Dael Wolfle, *America's Resources of Specialized Talent, A Current Appraisal and a Look Ahead,* New York, Harper and Brothers, 1954.

Under emergency conditions people tend to focus on single aspects of problems and propose solutions narrowly oriented to meet the exigencies of the moment. Some educational proposals favor a limited science with student energies purchased for previously determined ends. Such approaches may produce experts who are non-inventive and robot-like. Other suggestions emphasize number of experts although it may not be assumed that invention and discovery increase in proportion to the number of trained personnel. It appears that many of the proposals are directed toward military purposes with a shortsighted lack of interest in cultural and social issues and a willingness to ignore the problems of personal development.

Narrowness is encouraged not only by demands for practicality but also because twentieth-century man values technical know-how in the control of renewable resources and in the development of substitutes for non-renewable resources. He finds it easier to recognize competence in the natural sciences than in artistic or social fields. He overestimates the intelligence involved in scientific progress and underestimates the complexity of artistic imagination and social invention. Obviously, scientific understanding is indispensable in the modern world. It must be an essential ingredient in education but cannot long be useful if seen only as engineering and technology or if it is fostered at the expense of other knowledge.

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[2] John W. Gardner, "The Great Hunt for Educated Talent," *Harper's Magazine*, 214, No. 1280, January 1957, pp. 48–53.

[3] "A Quest for Quality in Scientists," *Life*, 40, No. 19, May 7, 1956, pp. 135–150.

Scientific education is not an alternative but an inherent element of sound education. Unfortunately the recent campaign for scholarship has sometimes taken an either-or view and ignored political, social, and personal goals. Nevertheless, the human is continuously challenged to build a society in which mature individuals may function in a self-directed and orderly fashion. Those who would achieve this end by regimentation value a smoothly functioning society directed to the production of many goods. They argue that this is most efficiently accomplished by skillful and obedient workers directed by a few well-trained leaders. The alternative or democratic view argues that such conditions are not suited to human nature or to the creative ability of man. This latter view calls for many broadly educated citizens co-operating in a self-determined society. Such a free and obviously complex system requires fine insight and noble leadership. It it particularly dependent on the effective training and use of human intelligence.

There is little agreement on what constitutes appropriate social, political, and personal development for the gifted. The confusion comes in part from divergences in political philosophy. There are several partly distinguishable ideologies, each of which can be construed as democratic. For example, the individualist proposes that individual success is good for society and that gifted persons must search out and use the advantages offered in a competitive culture. The gifted person is expected to profit from treatment equal and similar and from opportunity identical for everyone. The theocentric humanist calibrates success in units of moral and spiritual rather than temporal and material accomplishment. He requires the able individual to dedicate his leadership and to contribute his comprehensive insights and special capacities for the advantage of the less blessed—because they are all fashioned in the Divine Image. The pragmatic liberal emphasizes contemporary usefulness, the social nature of man, and the value of group decision or intelligence. In his view, status assigned to brightness is contingent on group approval and may be removed by the changing demands of society.

These are brief and largely superficial distinctions but they demonstrate that the mere classification of a point of view as *democratic* does not clearly define the status, the role, or the responsibilities of gifted and able persons.

It can be agreed that democracy draws much of its dynamics from individuals and from unique ideas. These ideas take strength from group consent or approval. It must be admitted that some ideas are judged good because they further the interests of a large number of people, or because they are simple and readily understood. Other productive or superior ideas are discarded because they differ too greatly from ideas which are commonly held. Errors in the selection of either ideas or leaders are calculated risks in democracy. Education is challenged to produce a more mature society effective in the coordinate use of both group judgment and individual intelligence. This maturity requires that the group should hear the unusual suggestion or the proposal of a disagreer but it requires, also, that the individual will not confuse "being different" or "being separate" with "being wise."

The cultural needs, scientific and social, are not the only criteria for determining the role for gifted people. Group needs must be cautiously balanced against individual rights. The recent Rockefeller Report on Education insists that the group must aid the individual in finding ways to identify and to maintain his individuality.[4] This respect for individuality is threatened as the culture becomes group oriented in a shift from rural to urban life and from handicraft to industrial work. It is particularly difficult to provide for the individual when a society is harassed by threat of war or internal conflict. North American culture enjoys a reputation for its ability to assure the individual a maximum development of his own capacities. This reputation was gained in a new civilization where the natural wealth and the free society combined to provide opportunities for the use of talent and to provide rewards for those who could contribute. Group demands and complexity of organization make it difficult to maintain this tradition but the ideal of the individual must temper the demands which society makes on its ablest children.

[4] Panel Report V of the Special Studies Project, John W. Gardner, Chairman, *The Pursuit of Excellence, Education and the Future of America,* Rockefeller Brothers Fund, Inc., Garden City, New York, Published by Doubleday and Co., Inc., 1958.

A renewed emphasis in the schools

No society can long afford the prodigal expenditure of ability or refuse to accept unusual insights. A complex society, a threatened society, a progressive society can least afford to lose these special contributions, nor can it disregard training which will provide the gifted with a strong sense of stewardship. It may not ignore the careful education of its gifted.

The cause of the gifted has become a popular one. The American Association for Gifted Children and its best-known spokesman, Paul Witty, have created a professional awareness of the issues involved in the discovery and education of this group. A book sponsored by the Association and published in 1951 played a major part in turning attention to the school situation.[5] Major educational projects have been undertaken by the Connecticut Board of Education,[6] by the North Central Association of Secondary Schools,[7] by the British Columbia Teachers' Federation,[8] and by other groups from coast to coast. There have also been a few spectacular attempts to use community resources to serve a greater range of individual differences.

Even with this attention it has been estimated that at least half of all gifted children will fail to realize their educational potentialities—a loss to themselves and to society.[9] Thoughtful observers favor action which will mitigate this loss but they are appalled by the proliferation of hastily considered educational solutions. The perspective of the moment encourages crash programs. Fevered enthusiasm seems to lead toward jack-rabbit activity—good on distance, poor on direction—but the task is too important to leave to well-meaning, uninformed action or to chance attacks. These may serve the moment, but they interfere with the long-run good of society and hamper the development of the individual.

---

[5] Paul A. Witty, Ed., *The Gifted Child*, Boston, D. C. Heath and Company, 1951.

[6] John Hersey, "Connecticut's Committee for the Gifted," *Educational Leadership*, 13, No. 4, January 1956, pp. 230–231.

[7] North Central Association of Colleges and Secondary Schools, *NCA Superior and Talented Student Project, A Prospectus*, North Central Association of Colleges and Secondary Schools, 1958.

[8] Stasia Evasuk, "Enriched Program Aim for the Bored Bright Child," *The Vancouver Sun*, Wednesday, April 11, 1956, p. 30.

[9] R. J. Havighurst, "Conditions Favorable and Detrimental to the Development of Talent," *School Review*, 65, No. 1, March 1957, pp. 20–26.

A cautious view discredits the proposal that the best of and the most educational services should be reserved for able children. Increasing civilization is accompanied by growing concern for the individual. There should be no hasty departure from the traditional conviction that each person in a free society has a common right to the educational opportunities which are appropriate to him. The Rockefeller Report maintains that the issue is not really an argument between quality and quantity in education; it is not a matter of educating a few people well or educating a large number less well. Modern society may not choose between these alternatives, for it must choose to provide for the maximum development of the individual potentialities at all levels. Retrenchment and cutting back of services for any group is not a solution appropriate to the purposes and the needs of modern society.

Extravagant proposals may be discarded after brief study and examination, but better proposals are possible only after careful study of the issues and a particularly careful study of the children involved. There is much that is unknown and much that can only be inferred. The following chapters may serve as a basis for a cautious look at the problem.

The gifted child is first of all a child, much like other children, but one with peculiar qualities or characteristics which make him a special educational problem. Planning cannot be wise unless it is soundly based on the available psychological evidences. An understanding of these factors is essential in identifying the gifted child, in discovering the nature of his special capacities, and in developing learning situations which capitalize on his special aptitudes.

It may be best to concentrate here on intellectual giftedness. This quality underlies most abilities and talents and is basic in academic talent which is extremely important in modern society. No very acceptable distinctions can currently be made between different kinds of intelligence if such differences exist. Neither are degrees of high intelligence accurately distinguished. For practical purposes the terms gifted, bright or intellectually superior may be used almost interchangeably. Terms which imply use of giftedness such as talented, rapid learner, superior student, and accelerated learner are only a little more specific. All of these terms imply a large component of general intelligence, and children with this quality are the subject of this book.

For both humane and practical reasons the concept of intelligence must be generous and broad, including ability in many fields and spreading over a relatively wide range of capacities in any one field. A large number of children must be prepared for the professions, for leadership, for artistic performance, for technical occupations, and for scholarly endeavor. This social requirement and the fact that it is very difficult to make accurate distinctions between the unusually gifted and the quite gifted makes it appropriate to think not in terms of 2 or 3 per cent of the population but in terms of 10 per cent or more. Gifted has often been applied only to children with IQs of 130 and up. The more generous category will include many below this level of general intelligence although a large percentage will be in the top 2 or 3 per cent in one or more academic fields or intellectual competencies.

A good study model should direct attention to the early years. There has been an unfortunate tendency to examine the problems of gifted children only in secondary school and college and to neglect the revealing evidence and vital problems found in childhood and early school years. It is during this period that foundations for academic competence, intellectual habits, and motivational patterns are developed. It is improbable that one can elaborate a set of educational principles which are applicable at one level but not at the next. The characteristics of intellectual capacity persist from age to age and characterize development at every level. We need not neglect the high school but it would be an error to make it the major focus of our thinking.

Without cautious study the energies expended for the gifted may result in programs with special names but no special aims, no special teaching methods, and no special materials. It seems ill-advised to promote programs without examining the forces which have led to the present school emphasis. It appears unwise to define the "gifted" prior to determining which characteristics differentiate the very able and the average. It seems frivolous to choose curricula before examining the sources of high ability or the peculiar contributions which may be expected from the able. It appears obtuse to select teaching methods before examining qualities peculiar to learning in highly intelligent children. These considerations must surely precede detailed planning and implementation of programs "equally suited" to the education of the gifted.

2

Cultural and Attitudinal Problems in Education of the Gifted

> If the Tiber overflows into the city, if the Nile does not flow into the countryside, if the heavens remain unmoved, if the earth quakes, if there is famine or pestilence, at once the cry goes up: to the lions with the Christians.
>
> *Tertullian Apologeticus, A. D. 197*

The school brings together a very large proportion of all children with a variety of intellectual, social, personal, and vocational needs. Special provisions are made first for less able students with more obvious learning problems. Consequently, one authority has referred to the gifted child as "the most neglected child in the average classroom of the public schools." [1]

The schools are social institutions responsive to attitudes common in the culture. This is particularly true in parts of the Western world where local groups have retained control of the educational system. There now seems to be a public interest in the development of human resources with special concern for the gifted. However, the present school situation or projected plans for the gifted must be evaluated partly in terms of the social and cultural forces which have fostered current inadequacies.

A *confused view of the gifted role*

In the mid 1950's many intellectuals held positions of power and trust. They were respected as individuals although frequently censored as a group. Their status, gained as experts, did not assure a satisfying role in community life. Intelligence most frequently appeared as a liability in the field of politics where "egghead" became a popular term of opprobrium. Occasional outbursts of anger were directed toward scientists who proposed fluoridation or some other policy.[2] It was at the policy-making level that rejection of gifted people seemed most common. The intellectual was not outcast but seemed suspect and alien in certain roles.

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[1] Robert C. Wilson, "The Under-Educated," *The Atlantic Monthly,* 195, No. 5, May 1955, pp. 60–62.

Courtesy of *Maclean's Magazine*
and the *Ben Roth Agency*

A favorite editorial topic was that educated persons, intellectuals, artists, and college professors were peculiarly susceptible to Communistic blandishments and frequently unperceptive and untrustworthy. There was a widespread feeling that scientists and intellectuals had not met their moral and political responsibilities. Mr. Average was not simply aggressive toward Mr. Able, he was genuinely apprehensive that Able would be either dishonest or unwise.

Complex modern warfare provides the most striking example of increasing dependence on specialized personnel. It is probable that

[2] Bernard and Judith Mausner, "A Study of the Anti-Scientific Attitude," *Scientific American,* 192, No. 2, February 1955, pp. 35–39.

the "common man" relinquishes his leadership and sense of universal competence with some pain and jealousy. Leta Hollingworth and others have argued that this resentment plays a major role in developing attitudes which interfere with education of the gifted. Even should this be an exaggeration, there are many instances of a tendency to lump together all who differ from ourselves and treat their needs as secondary to our own. Either neglect or a tendency to keep the expert in his place causes intelligence to be narrowly conceived and only partly developed.

Popular opinion generally favors "practical" education and is unsympathetic to academic and intellectual objectives which are not tied to vocational ends. This view prizes diplomas and degrees but prizes them for their economic value more than for inventive outcomes which education could facilitate. It equates "informed" with "educated" and makes little distinction between a spongelike absorbing of data and a thoroughgoing experience in learning. While modern writers describe a popular demand for intellectual renaissance, schoolmen report difficulty in encouraging truly scholarly performance because students see no reward for their efforts.

In mass production systems and in crowd cultures rewards go to the active ones with salable personalities, to managers and manipulators, and not necessarily to creative persons. The demigods in big corporations include accountants, tax experts and legal technicians who need not be inventive and imaginative. Among industrial and service workers, earnings tend to be identical from person to person without regard for the quality of work performed. J. B. Priestly has deplored the situation which he claims produced "dislike for original and creative men" because "no pigeonhole can be found for them." [3]

The talents or skills most likely to be developed are those useful in the current state of military or industrial enterprise but especially those valued in the particular society. Different cultures, different historical periods, and different social classes place different values on talents and they produce differentially in intellectual, artistic, and inventive fields.

[3] J. B. Priestly, "Our New Society Hostile to Bold, Original Minds," *The Vancouver Sun,* Saturday, August 27, 1954, p. 5.

A negative stereotype of the gifted

Differences among people, whether in color, religion, vocation, or intelligence, produce a degree of alienation or lack of understanding. The separation between the intellectual and the community at large has been examined by many writers.[4] Some have held that this separation is essentially different in a democracy, for there the group rather than the individual has ultimate power. The ideas that become influential are those which appeal to reporters and columnists because these take on value when promoted by instruments of mass communication. These media stress the arresting fact or the empirical evidence, especially that which can be presented in numbers and pictures. These may not be the facts which are significant to the expert and even when public opinion and expert opinion seem to coincide on policy there are great differences in view.

Growing specialization and voluminous increases in information enlarge the distance between layman and expert and at the same time alienate one expert from another. The specialist encounters difficulty in communicating with those in other fields and assumes that his own value is poorly understood and unappreciated. In such an atmosphere hostility grows; there is a reduced willingness to support or value other studies. The expert becomes the academic imperialist defensive toward both other imperialists and public opinion.

Alienation is two-sided. Men in general have long had doubts and mistrusts concerning the values of intelligence and rational thought. More than a hundred years ago Wordsworth wrote in *Tables Turned:*

> One impulse from a vernal wood
>   May teach you more of man,
> Of moral evil and of good,
>   Than all the sages can.
>
> Enough of science and of art;
>   Close up those barren leaves;

---

[4] Jacques Barzun, *The House of Intellect*, Harper & Brothers, New York, 1959, and Francis Stuart Campbell, *The Menace of the Herd or Procrustes at Large*, The Bruce Publishing Co., Milwaukee, 1943, and Alexis de Tocqueville, *Democracy in America*, Volume II, The Henry Reeve Text as revised by Francis Bowen, now further corrected and edited with introduction, editorial notes, and bibliographies by Phillips Bradley. Alfred A. Knopf, New York, 1945.

Come forth, and bring with you a heart
That watches and receives.

Philosophers and thinkers enjoyed comparatively high status during the Renaissance and considerable status during the Reformation and Industrial Revolution. Then the prestige of knowledge declined. Popular thought proclaimed the equality of men while philosophers such as Jacotot and Leibnitz emphasized the differences which resulted from training or environment. Darwin's work was frequently interpreted to mean that mankind made progress through natural selection more than through intelligent choice and planning. Pavlovian theory emphasized environmental conditioning and some Behaviorists considered intelligence the product of experience alone. Freud drew from both Darwin and Pavlov to develop a theory which highlighted the irrational qualities in man. Toward the end of the century the popular view of man shifted from the Godlike, rational being to the cultural animal moved by irrational, natural forces and altered by the environment.

The discounting of intelligence was combined with an increasing faith in the rightness of feeling and emotions, or naturalness. This belief encouraged confidence in the common man, the average man. Being "regular" became an important qualification for president, for a favorite actor or for an invitation to the community dance. Important posts were assigned not because the person was competent but because he was a "good Joe" and often thoroughly representative of the group.

Doubt and distrust of "intellectuals," "eggheads," "scientists," and "thinkers" developed easily in a society which preferred action to contemplation and material success to intellectual prestige.[5] There was a preference to reward participation and effort rather than to reward accomplishment. Willingness, activity, and participation were sometimes confused with excellence. Such conditions were not conducive to maximum development of gifted persons and Margaret Mead referred to them as "pressures for keeping on all fours with one's classmates, neighbors, [and] business associates."[6]

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[5] Leo Gurko, *Heroes, Highbrows, and the Popular Mind,* Indianapolis, Bobbs-Merrill Co., Inc., 1953, Chapter 1.

[6] Margaret Mead, "The Gifted Child in the American Culture of Today," *Journal of Teacher Education,* 5, No. 3, September 1954, p. 211.

Very bright people have been portrayed in novels, films, and conversation as impractical, unhappy, impotent, unbalanced, bumbling, bookish, and nearsighted. In fiction, these stereotyped unpleasantnesses have been removed when non-intellectual forces in the individual have been brought into play by romance or by violence. In general, sexual excitement and anger are more sympathetically portrayed than are judicial and thoughtful behaviors. The removal of a dowdy suit and heavy glasses, the addition of a night-club setting, a sleek dress, and two glasses of champagne transforms the cold, unhappy intellectual into the glamorous heroine.

Writers have implied that intelligence is blinding and gets in the way of both good sense and good fun. The gifted and bookish fellows lack virility, humanity and lovability. They are rejuvenated when impassioned love takes them from the library to the sword or to the oil derrick or to the western bronco. Following a consuming passion or an earthy brawl their characters are marked by less remoteness and by enlarged human feeling. The hypothesis seems to be that logic and contemplation are inappropriate to romance or deeds of courage.

In extreme form these views have led to fear of genius and rejection of gifted children. Artistry and genius have been attributed to madness and lack of moderation. Democritus said, "All good poets are out of their minds." In 1859 Moreau de Tours held that genius was, in fact, a psychosis. These views persist; during the graduation season of 1955 a newspaper editorial deplored the use of ability measures as criteria for admission to college.[7] The editor felt that there was a risk in giving too much attention to high IQ's for fear that a "race of intellectuals will be developed" and these would not be fully "adjusted to meet the day by day problems of an average society." While some believe that madness, early senility, and emotional problems are facets of superior intellect, others suppose that musicians, artists, and gifted persons have souls that differ, souls that are more fragile than those shrouded in duller clay. These extreme views lead on the one hand to rejection of gifted children and on the other to overprotection and coddling of talents.

There is a more common and more moderate belief that superior intellectual deviates tend to be ineffective and unhappy. Persons who hold this view expect the greatest success in a kind of Horatio Alger hero who may be of average or less than average intelligence but frequently defeats very intelligent and mean adversaries. Their view has something in common with a magazine article under the title, "It's Smart to be Stupid." [8] Sluggish, with his rusty brain box, was depicted as happy, long-lived, little-fatigued, not insomniac, and economically successful. The space under the high dome was described as the womb of stress, loneliness, worry, and early death. Such a view tends to limit enthusiasm for the intellectual and for intellectual training.

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[7] *The Bellingham Herald,* May 26, 1955, p. 6.

It has also been proposed that intelligent people are selfish and sly. One example of this is the belief that Western intellectuals ignored what they knew in order to avoid personal disadvantage and suffering in the struggle which they should have led against modern tyranny. This assumed failure helps remove them from the trust and the affection of the average citizen.[9] This conviction implies that it is possible to separate what one knows or thinks from what one does, to act contrary to belief. If action does not follow from what one sees or understands, the observer cannot discover the thought from the behavior. If the intellectual's thoughts are thus undiscoverable, the thinker may appear ominous or threatening. It is probable that all people have resented and feared contemporaries who were able to solve problems in a fashion which seemed to be effortless and magical. These fears may be tied to the atomic scientist as readily as to the witch doctor.

It may be argued that vast changes in attitude have occurred since the mid 1950's but there are few demonstrated changes in the popular picture of giftedness. Occasional distrust and frequent misunderstanding of intellectualism continue. Though communication facilities have been improved there is small decrease in the distance between the intellectual worker and his community. The politically powerful philosopher of the seventeenth century was austere, remote, and often inconsiderate of his community. Unless he has recently acquired it, the twentieth-century scientist does not have great political influence but he is often so involved in a narrow specialty that he loses contact with his neighbor and is himself misunderstood. These misunderstandings interfere with education for the gifted.

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[8] John E. Gibson, "It's Smart to be Stupid," *Colliers*, 123, No. 6, February 5, 1949, pp. 20–21.

[9] Raymond-Leopold Bruckberger, "An Assignment for Intellectuals," *Harper's Magazine*, 212, No. 1269, February 1956, pp. 68–72.

The equalitarian problem

The problems of alienation are almost inseparable from the arguments over equalitarianism. There has been an enduring argument that no one should be set apart, especially above others. This argument takes on unusual vigor when its proponents fear exploitation. In America, schooling has been seen as an entree to success and power and this reinforced demands for democratic equality. In this view schools should not increase the differences between children and should make a special effort to educate the able individual so that he will appreciate and live happily with average and intellectually-limited neighbors. It is sometimes proposed that these ends are best achieved by an education which is more or less identical for all.

Occasionally one hears the argument made by de Tocqueville more than a century ago. He believed that the democratic atmosphere suppressed scholarship because it encouraged study for gain rather than from dispassionate interest. He felt that striving for immediate usefulness reduced the meditation which he considered essential to truly scientific or theoretical study. Meditation was possible only for an aristocratic group less motivated by the cares of practical life. He further believed that in democracy intellectual products were judged by public and mercantile standards which encouraged a taste for easy and early success with superficial attention to deeper study.

The de Tocqueville argument is ordinarily applied to adult scholarship or to schools of higher learning. Opposition to similar or nearly identical treatment of gifted children in grade and secondary schools is more often confined to a discussion of curricula and methods. Some writers have held that demands for equal treatment are major impediments to providing for the gifted.[10] A few would go so far as to contend that quality and quantity are not possible together and that superior results cannot be expected in schools which seek to provide equal education for all.[11]

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[10] D. W. Smith, "The Plot Against the Gifted," *Education*, 78, No. 6, February 1958, pp. 351–355.

[11] C. Humphrey, "Equal: What?" *Peabody Journal of Education*, 33, No. 4, January 1956, pp. 204–206.

The dispute over equal opportunities engaged two famous authorities on education. The late Professor Bagley argued against providing special opportunities for the gifted. He scorned the idea that the gifted should be trained for leadership and proposed, instead, that schools should teach the average person when and where to tell his would-be leaders to get off. Lewis H. Terman and Melita Oden disputed this view and sought to point out fallacies in the argument, but many years later they were forced to the conclusion that Bagley's view survives and is fairly widespread.[12] Arguments for and against identical education were pursued with considerable bitterness but the last decade has been marked by diminishing conflict with most writers distinguishing between equality of persons and equality of rights. The arguments are important but they appear to reduce themselves not to the question of whether one group shall receive better treatment but whether each child shall receive treatment appropriate to himself. The problem is one of providing "equally suitable" rather than "identical" treatment for each child.

Conflicting views concerning education

It is popular to write on school affairs as if educators and citizens were irreconcilably opposed on most matters. The evidence supporting such a contention is superficial, at least as it concerns the gifted child. There has been an extended attack on educational practices since World War II with charges of incompetence, disregard for values, and other failings. Among the recurring charges is one of intellectual failure in the schools with teacher-hostility toward intelligent children and teacher-rejection of intellectual content. It is difficult to appraise the values which underlie such acrimonious discussion. At least some of the critics assert a major interest in the cause of gifted leadership and high ability. Canon Iddings Bell wrote:

> Our colleges are neither discovering nor preparing those few—be they from palaces or slums—who potentially are fit to serve their own people as leaders.[13]

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[12] Lewis M. Terman and Melita H. Oden, "Major Issues in the Education of Gifted Children," *The Journal of Teacher Education,* 5, No. 3, September 1954, p. 230.

[13] Bernard Iddings Bell, "Our Schools—Their Four Grievous Faults," *The Reader's Digest,* 58, No. 345, January 1951, p. 124.

The critics tend to assume that they alone are advocates for the gifted but this is not the case. Educators have had a continuing interest in this issue. In 1914 one of them deplored the tendency to interpret the phrase "equality for all" to mean identical treatment with consequent waste of talent and damage to the national welfare and social progress.[14] A third of a century later the Educational Policies Commission recognized the schools' responsibility in preparing the able student for positions of leadership on the premise that American society needed that influence. The Commission pointed out the current waste:

> A considerable proportion of the potential abilities of gifted individuals is at present lost to society through underdevelopment, underuse, or misuse. Some of this waste is attributable to economic barriers to educational and vocational opportunities. Some is caused by social attitudes that tend to lower both incentive and opportunity for gifted children of families with low socio-economic status. Some loss results from mental illness and emotional maladjustment. And some human talent is wasted because the schools fail to identify, to challenge, to hold, or to educate adequately some of their gifted students.[15]

School energies have sometimes turned to the emergencies of the moment with neglect of important long-run objectives. A Canadian educator summarizes as follows:

> To claim that modern thought has made a genuine contribution to education is not to claim that all is well. The wave of controversy now flooding the English-speaking educational world is surely symptomatic of deep-seated ills. In their attempt to cope with the exigencies of the times, and in their anxiety to solve the more immediate problem of providing universal elementary and secondary education, the responsible authorities have given the educational structure more breadth but less height and in so doing have, temporarily at least, served the many better and the few less well. No serious educationalist is satisfied to sacrifice such a very important segment of society as its intellectual elite on which so much depends. No one will deny that we need the scholars and the research men. Without them the well-springs of learning could dry up all too rapidly and the

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[14] Mildred G. Fox, "Providing for the Gifted," *Bulletin of Secondary School Principals*, Part II, 37, No. 195, November 1953, pp. 78–81.

[15] Educational Policies Commission, *Education of the Gifted*, Washington, D.C., National Education Association, 1950, pp. 85–86.

> frontiers of knowledge be no further advanced. The problems, difficult as they may prove of solution, are being vigorously attacked. We have every reason to believe that the needs of the intellectually superior will be met without sacrificing the different needs of the majority whose welfare and well-being must be of growing importance if democracy is ever to become a socio-economic as well as a political reality. The aim is surely not to choose between the need of this group and that, but to educate everyone to the limit of his capacity. The general malaise in educational circles is proof of the educator's concern.[16]

Effective approaches to education of the gifted require much more than a simple agreement on the significance of this group. Some lay critics feel that rejection of their proposals results from anti-intellectualism among educators. Actually, some of the proposals have been impractical and few have been tied to research or experience. Some of the most persuasive ideas have been supported only by a particular incident or by a striking example. A Canadian authority points out that a major obstacle in the way of achieving widespread co-operation arises because "the public has never understood the problem of individual differences." [17] Suggestions are often made as if education consisted of learning a fixed body of material and teaching consisted only of orderly presentation of this material at speeds appropriate to the various intellectual levels of the students. This simplified concept of storing the facts seriously hampers the development of programs suited to the gifted.

Many pages in the educational debate have been devoted to discussions of curriculum. Much of this discussion has been between professional and professional rather than between layman and professional. The critics have generally proposed more academic programs while teachers and administrators in the public schools insisted that such programs were not suitably broad enough for any student, but were highly inappropriate for the less able students. The common proposals followed one of three general patterns. The first group favored more liberal and less practical or vocational education. Typically, President A. Whitney Griswold at Yale [18] and Robert Hutchins, formerly Chancellor at the University of Chicago,[19] advocated a liberal education characterized by focus on thought rather than on social or technical skills. Proponents of this position would eliminate many specialized courses and would hope to teach principles which may be found useful in solving new problems.

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[16] G. A. Frecker, "Presidential Address," *Canadian Education*, 10, No. 1, December 1954, pp. 22–23.

[17] Samuel R. Laycock, *Gifted Children*, Toronto, The Copp Clark Publishing Co., Ltd., 1957, pp. 3–4.

The second group also emphasized a reduction in social and skill training but proposed an academic more than a liberal curriculum. An example of this view can be found in one of the early books of criticism, *And Madly Teach*, in which Mortimer Smith argues for an education which he considers "chiefly intellectual and moral." [20] The advocates of a concentrated subject-matter curriculum proposed to discover intelligence and train it.[21] They assumed that this training could best be accomplished through academically oriented or "solid" courses and they deplored what they called "snap" courses.[22] The "snaps" included skill and specialized courses but the sharpest criticism went to life-adjustment courses. Most educators agreed with the premise that some subjects are intrinsically of more value than others but they did not agree that the others were so valueless that they should be eliminated.

The third group advocated a subject-matter education emphasizing content with practical value in meeting the demands of the civilization. They had a particular concern with subjects such as mathematics and physics which were deemed important in international military competition. The statistics used to support this view have frequently been faulty. For example, published statements indicated that less than 5 per cent of American high school students studied physics when United States Office of Education information (1956–1957) indicated that 50 per cent of the upper half of the entire twelfth grade studied that subject. It was asserted that less than 12 per cent studied algebra and geometry though the data indicate that 67 per cent of ninth-grade students registered for algebra and 41.6 per cent of tenth-grade students registered for geometry.[23]

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[18] A. Whitney Griswold, "What We Don't Know Will Hurt Us," *Harper's Magazine*, 209, No. 1250, July 1954, pp. 76–82.

[19] Robert M. Hutchins, " 'Liberal' vs. 'Practical' Education—The Debate-of-the-Month," *The Rotarian*, 69, No. 3, September 1946, pp. 14, and 62–63.

[20] Mortimer Smith, *And Madly Teach*, Chicago, Illinois, Henry Regnery Co., 1949, pp. 10–24.

[21] Bernard Iddings Bell, *Crisis In Education*, New York, McGraw-Hill Book Co., Inc. (Whittlesey House) 1949, p. 60.

[22] Howard Whitman, "Our Schools—Afraid to Teach," *Colliers*, 133, No. 6, March 19, 1954, pp. 34–40.

The element of agreement in these three views is the emphasis given to academic and intellectual outcomes which are generally conceded to be attainable and useful for gifted children but are less teachable and less useful for slower learners. The critics generally failed to deal adequately with individual differences, whether intellectual, environmental, or emotional. They did not distinguish between what is possible in highly selective secondary schools and what is possible in schools which serve the total range of ability.

The defenders of current practice contended that: (*a*) No one curriculum was appropriate for all; (*b*) Education through accumulation of facts served Britain well in the nineteenth century because the program was offered to a select population possessing the intellectual capacity to make judgments, and the social and political position to implement these judgments. However, the qualities of the British gentleman must be attributed only in part to his formal schooling. A similar education would appear to contribute even less to a modern student from a different social class preparing for different goals; (*c*) Modern schools are not less moral or less intellectual than they were, but they are more friendly and less rigid and this is frequently interpreted as softness;[24] (*d*) There is, as Alfred North Whitehead contended, no one subject-matter discipline which provides culture and another which gives specific knowledge. The various knowledges are brought together from a variety of experiences into a single body with each aspect of learning having a peculiar reference to the life of the learner;[25] (*e*) Sound personality and intellectual development are not competing goals but complementary, contributing one to the other.[26]

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[23] Educational Policies Commission, *The Contemporary Challenge to American Education*, Washington, National Education Association, 1959, pp. 19–20.

[24] Edward G. Olsen, "Is the Community School 'Anti-Intellectual'?" *The School Executive*, 78, No. 2, October 1958, pp. 23–25.

[25] Alfred North Whitehead, *The Aims of Education*, New York, The Macmillan Co., 1929, p. 22.

[26] Allen L. Bernstein, "A Reply to 'Reform Plan for Schools'," *Phi Delta Kappan*, 39, No. 2, November 1957, pp. 73–74.

When the argument touched on method the critics proposed that competition and the threat of failure should be more freely used.[27] They believed that competition encourages hard work and results in competency. One of the bitterest views was expressed in 1953 by Hilda Neatby, a Canadian historian, who would preserve the "citadel" from the "barbarians." She urged schools to reform and stop worrying about "drop-outs," but offer an intellectual curriculum, and if students "prove themselves unable or unwilling to profit by it they should not only be allowed to quit they should be obliged to withdraw." [28] Those who opposed the "tough" view argued that competition which had been functional in securing and holding property was less useful in the motivation of scholarship or learning; and simple difficulty was an inappropriate measure of the value of an experience. Nevertheless, there is an increasing willingness to impose standards. This may be inferred from popular writing, from the spectacular increase in statewide and national testing programs, from professional writing, and from conversation on educational topics. There seems to be a generally changed view concerning the responsibility of the individual. In the last century, man was conceived as rational, competitive and filled with initiative. In this century he has more often been viewed as driven by primitive and irrational drives and as less resolute in achieving his ends. The concept of his competitiveness continued but the person was interpreted as more fragile and emotional and, accordingly, less responsible. If there is a new trend, it is toward the earlier view of man as rational and enterprising. With this view there is a general tendency toward holding the student responsible for greater achievement.

The proposals for school change have ranged from minor adjustments to sweeping changes involving every aspect of the school program. An example of recommendations for complete overhaul can be found in the writings of Admiral Rickover.[29] He seems to have a preference for a European kind of school in which the emphasis is academic and the "concern is with the intellect alone." [30] He recommends the same basic course for all students with adaptations to individual differences made only in terms of speed and point of termination. These differences would be met in segregated schools, and he minimizes the possibility that teaching method could greatly modify the outcomes. He prefers a comprehensive government examination system although he apparently assumes that competence is closely related to the timetable hours assigned to the subject.[31] Views such as these have been widely read and have influenced thinking about gifted children. The proposals have been made in hostile fashion and this results in widespread dissemination in the news media. The views are more commonly known than are the conclusions, or findings, from a half-century of research and study involved in the *Stanford Studies of Genius.*

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[27] Howard Whitman, "Report Cards: EGFU, SNUX or ABC?" *Colliers*, 134, No. 6, September 17, 1954, pp. 58–62.

[28] Hilda Neatby, *So Little for the Mind*, Toronto, Clarke, Irwin and Co., Ltd., 1953, pp. 332–333.

[29] H. G. Rickover, "Let's Stop Wasting Our Greatest Resources," *Saturday Evening Post*, 229, No. 35, March 2, 1957, pp. 19 and 108–111.

The significance of the criticism should not be overrated. It has come in larger volume during the last decade but it is not essentially new. As early as 1911 one critic proposed that physicians should decide educational policy—a policy not directed to "the training of Philistines but the education of genius." [32] The author deplored the making of clever businessmen, resourceful politicians, and cunning artisans at what he assumed to be the expense of developing scientists, artists, philosophers, statesmen, and genius. In 1957 a critical school superintendent echoed some of the same complaints and proffered some of the same recommendations.[33] Restrained and limited controversy seems to produce desirable results but the recent mode of disagreement has been extreme and aggressive. It engenders attitudes which limit free interchange of ideas because it threatens the self-respect of the participants. At its height the debate produced confusion and resistance and probably delayed progress in solving the educational problems of the gifted.

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[30] H. G. Rickover, *Education and Freedom,* New York, E. P. Dutton and Company, Inc., 1959, p. 154.

[31] H. G. Rickover, "A Comparison: European vs. American Secondary Schools," *Phi Delta Kappan,* 40, No. 2, November 1958, pp. 60–64.

[32] Boris Sidis, *Philistine and Genius,* New York, Moffet, Yard and Company, 1911, p. 2.

[33] Max Rafferty, "The Philistines," *Phi Delta Kappan,* 39, No. 2, November 1957, pp. 42–46.

Universal education and the range of ability

The school is faced with the task of helping each child to achieve his greatest potential. In assisting one it may not infringe on the potential of another. This involves problems of policy. For example, should teachers make special provisions for gifted children from the lower social classes since they are less motivated in academic learning? Should all gifted children be encouraged to go to college? Should the school resist when industrial or military needs induce gifted students to leave school early or to concentrate in a single field of study with neglect of other areas? There are also significant methodological problems. Education for all the people necessarily means education for more of the people at the lower end of the intellectual scale. Fewer children are now considered uneducable. In an earlier period more children tried schooling but dropped out in the second or third grade after several years in attendance had proved that they would not "read, write 'n figger."

Larger proportions in school, earlier entrance, and changes in promotion policy have altered the complexion of every grade. Children in the fourth grade now are about one year younger than fourth-grade children were thirty-five years ago.[34] Even more spectacular changes have occurred in the high school. Between 1870 and 1955 the population increased four times but the number of high school students increased one hundred times. In 1870 sizable groups of children did not reach the fifth grade but of those who did, about 2 per cent were graduated from high school. Today a large majority of children remain through the twelfth grade. Clearly, the 2 per cent graduating in 1877 were more select than the modern group and clearly one of the major factors in this selection was learning ability.

The practical implications of these changes are rarely imagined. In 1930 an eighth-grade teacher might expect that nearly half of the children in her class had failed at least one grade and a very few, about 3 per cent, had been accelerated. Unless a pupil had above-average intelligence it was unlikely that he had been regularly promoted. The mental age spread for the class approximated eleven years. In a modern class, the spread would be closer to fourteen years. More important than the raw spread is the fact that in 1930 there were about one-third as many students with mental ages under twelve and all of these had school experience extended at least one year.

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[34] J. Wayne Wrightstone, *Class Organization for Instruction*, Washington, National Education Association, 1957, p. 4.

Retention programs did not produce homogeneous classes but they tended to eliminate the dull and to assure that slow learners had longer schooling. This provided a kind of acceleration for gifted students. Dr. Clarke at the University of Alberta summarized practices for more than three thousand teachers and eighty thousand pupils in 1954. Alberta teachers practiced retention in the degree reported in Table 1. On the average they retained 5.4 per cent in the first eight grades, with the highest rate in the first and seventh. They conditionally promoted another 5.1 per cent of whom 15 per cent were later demoted. This makes a total average retention of 6.1 per cent. It should be expected that eighth graders in Alberta are substantially older, more academically experienced, and ready to profit from methods which would be inappropriate where almost-continuous promotion is practiced.

Table 1

Percentage of Retention in Alberta Schools
1954

Grade	*Failure*	*Conditional Pass and Demotion*	*Total*
1	6.5	.525	7.0
2	5.5	.660	6.2
3	5.8	.840	6.6
4	5.3	.780	6.2
5	4.6	.840	5.4
6	4.4	.780	5.2
7	5.9	1.125	7.0
8	4.5	.720	5.2

Source: Clarke, S. C. T., "Promotion Practices and Policies in Alberta Schools," *The Alberta Journal of Educational Research*, 1, No. 4, Dec. 1955, pp. 24–34.

Under a policy that each child should be retained until his mental growth is entirely adequate for grade placement (using the Alberta eighth grade as a standard) it would be expected that 7 per cent of the population would spend two or more years in the first grade and approximately 34 per cent must fail one of the eight grades. Under rigorous application of these standards, the eighth grade would include children who are in their fourth year of school and others who are in their nineteenth year. Probably no school has ever practiced such a policy, and accrued data do not demonstrate that one system has advantages over the other when pupils are equated in natural endowment and in length of school tenure. However, the modern teacher is forced to abandon procedures which might have been usable in the eighth grade of 1930.

Schools have met part of this increased-ability range with phenomenal success. The limited student is not changed into a complex academician for this is impossible. He is taught social skills and routine practical skills which make him largely inconspicuous and reasonably successful in post-school life. To the school must go considerable credit for a decreased proportion of dull people hidden by their families and a decrease of unproductive people in the society.

The schools have been slower to adapt to gifted children. It has sometimes been assumed that they have no special needs, that they can learn for themselves and that talent inevitably emerges if present. While specialized and remedial education for the handicapped expanded vigorously since its beginning in the 1890's it was harder to mobilize support for the gifted. The educational task was so large that it was difficult to meet all needs at the same time.

Credit by the hour

Measures of education in terms of credits or in terms of attendance-hours contribute to a shallow view of learning which ignores the depth and creativity possible among the gifted. In practice, education is described in terms of years of attendance or degrees which are understood in year equivalents (with perhaps the exception of the doctorate) or in credits which are computed in time measures. These descriptions are appealing because they are specific and facile, but they lack meaning since they ignore the amount of information acquired, the motivations which have been learned, or the imagination which has developed. When the major prerequisite for a school activity is some previous activity rather than present capacity or readiness, and when outcomes are measured in input hours, it is likely that adaptations to the gifted will be few.

Time measures in education have been accepted because similar measures are common in society. Parents, paid on a time basis more than by quality or quantity of work are not inclined to reject a similar pattern in the school. The hours-of-credit plan is easily administered and provides a superficial sense of order with school entrance at a prescribed age and progress on a chronological schedule. This contributes to what Terman called a "lock-step" system which he considered most injurious to the able student.[35]

In general

Cultural and attitudinal forces set some of the problems and shape directions for education of the gifted. The school must deal with the cultural influences as well as with individual differences. The negative influences must be examined because wiser decisions are made by assessing the negative as well as the positive.

In brief, the popular conception of intelligence is inadequate. The social value of giftedness is conceded, but high intelligence is sometimes perceived as dangerous and sinister to others, and frequently perceived as a liability to its possessor. This view is widespread enough that many parents say, "I am relieved to find that my child is not a genius." Such attitudes influence both the individual child and policies controlling the school. Attitudes range all the way from a fearful avoidance of education for creativity to a demand that invention should be encouraged without limit; from the belief that genius is a matter of inspiration which cannot be formalized and taught to the belief that inventiveness is developed by an unyielding mastery of a single subject matter. Increased confusion has come through the recent vigorous conflict concerning education. The conflict itself makes it particularly difficult to provide a consistent and friendly atmosphere in which school and community may co-operate to nurture giftedness without using the child to prove a point.

There are other school problems which must be understood in the total community. Some of these arise out of universal education which brings together students marked by diversity in intellectual capacity, environmental background, social attitudes, motivational pattern, and vocational goals. Other problems arise out of the belief, now disappearing, that talent will always manifest itself, regardless of conditions. Finally, there are school problems peculiar to programs which are planned by age and by time with inordinate importance attached to the belief that each person must go through each experience in the proper sequence.

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[35] Lewis Terman and Melita Oden, "Major Issues in the Education of Gifted Children," *Journal of Teacher Education*, 5, No. 3, September 1953, p. 230.

3

Identification by Observation

Intellectual giftedness is not easily defined nor readily discovered. Nevertheless, appropriate school adaptations await both an understanding of qualities peculiar to high intelligence and the ability to select children who possess or can develop these qualities and capacities.

Example of gifted school children

Harry Anderson is the principal at Elm Road School. He is a mild but earnest man, eager to help any child—big or little, reader or non-reader, clean or grubby, dull or gifted. Four of these children may serve as suitable illustrations for a study of the gifted. They are typically gifted more than unusually gifted. In many ways they are like average children but in some qualities they are significantly different.

Stephen—an example especially marked by verbal and abstract intelligence in an educationally sophisticated home. Stephen, a cocky seventh grader, is one of these children. He is a good swimmer although small for most sports. He is now a little vehement in his denials of all interests in girls. He works to achieve closeness with his own group but is not always successful. Students recognize his ability; they elect him to carry out specific office rather than show him affection. Stephen gets into scrapes. These are characterized by lack of judgment—usually, he does not know when to stop. He is never sadistic or cruel and accepts responsibility when halt is called. At such times he is quiet but not morose.

At eight years and three months, Stephen was tested by a psychologist who used the 1937 revision of the Stanford-Binet and other instruments. Stephen's mental age was then eleven years, ten months and the computed IQ was more than 140. Stephen reads voraciously, is informed on almost any topic, and uses an excellent vocabulary; but like most gifted children his academic accomplishment is less advanced than his ability.

Principal Anderson knows that Stephen comes from a professional family with high academic standards; Stephen is expected to read, to be articulate, to be informed, and to be exact. He is sensitive about his size and very anxious for approval by his peers. He cannot secure this approval in football or feats of strength and he will not secure it by excellent academic work because "being a brain" is not approved in the seventh grade. Therefore, he is ambivalent, momentarily seeking success by adult values and then by children's values. Superficially his behavior must seem erratic, now suddenly polite, poised, highly interested in adult conversation, all but asking to be told he is grown up; and then, just as suddenly, rejecting responsibility and embracing every immaturity his classmates may devise.

Stephen is a problem to Mr. Anderson. He transferred to Elm Road in the fourth grade. He is the youngest member of his class and is smaller than average in the group. The indications are that Stephen will be a tall man but he has a family history of slow physical growth in adolescence and early teens. He is on the verge of a growth spurt but is small and sensitive now. This and the fact that he would miss units of work might make acceleration inadvisable. In any case, acceleration is not encouraged within the school policy. Then, what is best? Should he be kept in line, toned down, slowed up, or is there a way in which this intellectual agility can be expanded and used?

Nancy and *Kathy*—examples particularly characterized by personal and social maturity in a rural and unsophisticated society. Here are two newcomers at Elm Road. They are sisters who entered in October. Previously, they lived on a farm and attended a very small school. Nancy is in the second grade and Kathy, thirteen months younger, is in the first. They started school a year earlier than average but, because they transferred, Kathy has been continued in school, though underage for Elm Road.

These children look somewhat alike, are large for their ages and are socially and personally mature. They are fond of each other but also secure in other relationships. They fitted in at Elm Road immediately, took part in everything, learned the rules quickly, liked the teachers and children, and they were enthusiastic about what was underway.

Nancy giggles and clowns and plays but she is serious and sensitive, too. She is interested in history, in faraway lands, in grown-up clothes, and in games and boisterous noisy fun. She returns quickly to responsibility and to serious things. Perhaps that is why the children so often elect her to represent them.

Kathy is usually "on her toes" in the literal sense. She is warm, friendly, and eager; she applies herself with vigor to work or to play. There is a subtle difference between the vital earnestness of Kathy and the sensitive responsibility of Nancy. It is true that both are bubbly, ready for fun but Nancy is a little more likely to mix wit and fantasy in her play.

Mr. Anderson found that the parents of these girls were proud of their children, thought they did well, but did not set academic expectations for them. The children always enjoyed reading and were read to at great length but not very selectively. They always participated in private and family talks. They discussed the kind of house to build, whether they should have a brother, and a suitable name for him when he would arrive. They have been encouraged in independence—selected which dress to wear, chosen how to spend their money, and determined the color schemes for their rooms. The parents have allowed them to recognize consequences of decisions. Kathy lives with, and she likes, each of the three paint colors and the wallpaper chosen for her room.

Kathy has enjoyed excellent health. Nancy was less fortunate when quite small but now both are well, large, vigorous, and agile. They were given Stanford-Binet tests when they were three years, four months and four years, five months, respectively. They were advanced in mental age by about two years and two and a half years. The tests were given under rather inadequate conditions but the computed IQs were within three points of each other and placed them easily above 145. Nancy took a test later and performed well above the 145 level.

Mr. Anderson has often noted the in-family relationship of ability and success. Nancy and Kathy are delighted with school except that Nancy has on a few occasions explained, at home, that things are too simple and too repetitive. What then of the future? Will boredom set in? These children, like Stephen, are younger than their gradermates.

Can their success and pleasure in school be accounted for by their ages or by the fun they have had in learning at home? Will they enjoy the seventh grade?

Pete—an example characterized by alertness and enthusiasm in the home of a businessman with more-than-average intellectual interests. Here is a boy who is not at Elm Road. He is just older than Kathy but was too young to be admitted. Black-haired, dark-eyed Pete has a flashing smile. He is slightly above average size but his social habit, his vocabulary, and his range of interests make him seem mature. One evaluation of his intelligence found a minimum IQ of 126, so that at six years his mental age was seven-and-a-half years. A later test raised the IQ estimate by as much as eight points.

Pete would like to go to school. He has always been eager to grow up. He is the older of two children and appears both responsible and able. He draws well, is co-ordinated, plays with older children if they are to be found, counts and reads a little. Mr. Anderson must sometimes tell parents that their children are not old enough to enter school. The mothers are disappointed but usually the children pay little attention. Pete was different. Mr. Anderson felt he must tell Pete and Pete was disappointed. Should he be in school?

Harry Anderson has other gifted children but these are typical. Their ability spreads over the range ordinarily called gifted. He wishes he knew what is best for Stephen and Nancy and Kathy and Pete. He knows that schools are criticized for anti-intellectualism but he knows also that taxpayers would object should Elm Road become a very academic school emphasizing only subject matter and refusing to promote less able students.

General Observations

"That boy will succeed. He will be an important man—100 per cent in arithmetic, almost perfect in themes, tops in every course. He uses adult vocabulary and reads everything in sight. He is really sharp and he should be encouraged to go far in school." Such items are the basis for judgments made by parents and by teachers. Behaviors like these determine the expectations of success and they cause adults to select fitting educational experiences.

Some educators, following the lead of Sir Francis Galton, search for gifted children only in gifted families. A few perceive intellectual capacity in physical appearance, alert expressions, good manners, and neatness. The vast majority, however, search out ability in school grades and in academic success. They hypothesize that the child who can perform will perform. They point out that members of a class do a creditable job of ranking themselves.[1] The order in which children are chosen for a spelling team is surprisingly like the order of a teacher's rating or the order on achievement-test scores. Children frequently and regularly describe certain of their classmates as "smarter than other kids." More often than not these are the same children that are selected by teachers as "more intelligent than average."

We cannot fail to be impressed with the limitations of the rating method. It is often reported that Walter Scott was considered a "dunce" although at seven years he is reported to have enjoyed the exotic and melancholy literature of the East and by ten years he had developed his own library. Generations later, his countryman, Sir Winston Churchill earned the reputation of being a poor scholar. This does not mean that the teacher thought Churchill was unintelligent, but it probably does mean that the true level of his ability was not suspected. However, there is no need to dwell on dramatic cases to prove the inadequacy of the unstructured observation in the discovery of ability.

Teachers learn that school grades are a deceptive criterion because students are unequal in their educational preparation, motivation, social maturity, and other factors that affect classroom learning. Modern teachers with a more psychological orientation are perhaps more likely to account for the diligence, the efficient study habits, the achievement expectancy, and other factors that influence competency.[2] Grades in school citizenship, however, continue to pervade every observation that is made in order to rate intelligence.

An extensive study of the halo effect as it operates on estimates of intelligence was accomplished by W. Drayton Lewis in 1947.[3] Data gathered from a population of forty-five thousand between grade four and grade eight from 455 schools in thirty-six states confirm the supposition that teacher estimates are influenced by school behavior. Teachers in the investigation rated very few as genius (.74 per cent). Girls were consistently favored though other evidences give some support to the supposition that boys are slightly more likely to be in the genius group. Experienced school people, however, have observed over a long period of time that verbal facility, neatness, school interest and physical attractiveness are more rapidly developed in girls. It seems reasonable, therefore, that teachers in the elementary grades should overrate the intelligence of girls because they have social and academic qualities.

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[1] Albert T. Oliver, Ed., *Guiding Your Gifted, A Handbook for Teachers, Administrators and Parents*, Philadelphia, Educational Service Bureau, School of Education, University of Pennsylvania, 1954.

[2] Educational Policies Commission, *Education of the Gifted*, Washington, D.C., National Education Association, 1950, p. 88.

[3] W. Drayton Lewis, "Some Characteristics of Children Designated as Mentally Retarded, as Problems, and as Geniuses by Teachers," *Journal of Genetic Psychology*, 70, No. 1, March–June 1947, pp. 29–51.

In the Lewis study, teachers rated the genius group as superior in desirable characteristics: dependability, friendliness, happiness, honesty, originality, ambition, orderliness, superior range of interests, superior participation in school activities and better sense of humor. It is entirely possible that they overrated the neat, the obedient, the pretty, and the orderly while they may have underrated the inquisitive, the doubting, the independent, and the active.

Margaret Mead has noted a consistent tendency in our society to resent or undervalue those who succeed easily.[4] There is a feeling that success is better when it follows a long, hard climb. We are unlikely to reward behavior which seems lazy and we are particularly unlikely to reward easily-attained performance in a field of our own proficiency. If a student works poorly but earns A grades on a test, his ability is less likely to be recognized than is the somewhat lesser ability of one who earns A grades by working consistently and long.

All four children described in this chapter are likely to be recognized as highly intelligent. Those who stress alertness, physical appearance, social maturity, and vocabulary will see all these in Pete. Those who attend to family similarity, peer approval, citizenship, range of interest, and rapidity of development will find all of these in Kathy and Nancy. Those who search out subtlety in vocabulary, spectacular intellectual performance, and curiosity will note all of these in Stephen. It is probable that Pete is least likely to pass unnoticed although his ability is lowest in the group. Stephen may be missed because his academic work is imperfect and because his repertoire of extraneous knowledge is threatening to the teacher's status. Nancy and Kathy may be bypassed on account of their sociableness, because their environment leaves them with an effective rather than a spectacular vocabulary and because they appear older than they really are.

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[4] Margaret Mead, "The Gifted Child in the American Culture of Today," *Journal of Teacher Education*, 5, No. 3, September 1954, pp. 211–214.

Many people feel that gifted children may be readily discovered. The evidence indicates that half or more of them are not found. Brightness is much less obvious than dullness because:

1. Gifted people are capable of average behavior whereas the dull are not. Therefore, many gifted children do not appear equally distinctive.
2. Many gifted children live in situations that do not elicit verbal, academic, or ingenious behavior commonly noted as a symptom of intelligence.
3. Gifted responses are marked by appropriateness and by the fact that they are induced by small clues. The actual performance or observable behavior may not appear unusual.

Reliable and valid judgments concerning giftedness are needed. They are based on deliberate and organized observation. Wherever structured and formalized ratings have been substituted for casual opinions, results have been superior.

Organized Observation of Behavior

Efforts to describe and efforts to discover high ability have frequently been characterized by the common assumption that high intelligence is different in quantity rather than in kind from low intelligence. This view has been supported by behaviorist and associationist psychology as well as by current enthusiasm for statistical and objective sciences of man. This bias is not universal and some modern psychologists would deny that the quantity or continuum idea is descriptive of intelligence range. Even they accept a conclusion that, usually, more intelligent people can do more things and more complex things than people in general.

On the other hand, the quantity theorists are not likely to balk at the idea that increased ability makes possible performances which would be impossible for less able subjects. It is probably possible to reconcile the views and agree that the formulation of certain concepts and solutions requires a minimum intelligence above average and that able people do things which differ from average behavior. Consequently, a search for giftedness requires observations of both quantity and kind (difficulty and content) as characteristics of intelligence.

Scientific thought on the nature, discovery, and nurture of intelligence is tremendously indebted to Lewis E. Terman, late professor emeritus at Stanford University. His interest in ability differences which affect learning dated from his student days, and his contributions are particularly important in the identification of ability. He planned and directed the major revisions and standardizations of test materials published in 1916 and 1937 as the *Stanford-Binet Intelligence Tests.* No psychological instrument has enjoyed such universal application and confidence. Until his death in late 1956, he continued a vital interest in gifted children and his studies provide the best total descriptions of ability.

Terman's doctoral thesis, dated 1907, compared the learning of seven bright and seven dull children. He followed this in 1913 with a study of bright children in San Francisco. In this study he found that, contrary to public opinion, the children were not sickly, queer, or antisocial. Another study of 124 children in 1919 was a forerunner of the tremendous work that is usually known as the *Stanford Studies of Genius.* These investigations were begun in 1921 with money secured from the Commonwealth Foundation. To this Terman added other grants and some money from his own university. With these funds he assembled a staff which included such currently famous names as Burks, Oden, Cox, Goodenough, Kelley, Ruch, Willoughby, and Yates.

This study is still underway and its findings provide invaluable materials to aid us in the description of the gifted. Five volumes report the study achievements to date: the first of these describes the characteristics of one thousand child subjects; the second, a Galton-like volume, reviews the traits of three hundred historical geniuses; a third volume summarizes the status of the one thousand original subjects at a 1930 date; the fourth volume, in 1947, is a follow-up of the same subjects. The latest volume, published in 1959, after Termans death, is a study of these subjects at mid-life.[5]

Terman studied the group, established norms, and contributed to a more informed concept of giftedness. Another pioneer, Leta Hollingworth, made more detailed reports on very select children. The 1942 volume, *Children Above 180 I.Q.*, provides many insights into the nature of giftedness.[6] Her description of child A, with an IQ of approximately 190, includes a large number of factors found in other cases of giftedness. This boy was German-Jewish, descended from families characterized by longevity, good health, absence of mental incompetence, self-dependence, and some fame. His father had patented several inventions and made the layout for one of the largest steel plants in the United States. His paternal relatives founded a banking house, and a tailor among them devised a patented union suit and an improved buckle for adjusting men's vests. Among the maternal relatives there was a judge, a leader in Jewish reform, and the founder of a successful optical business.

A younger brother was healthy, handsome, had an IQ of about 150 and at five years carried out a project of counting all of his footsteps until he reached a million. A's family was typical for those of gifted children, male dominant, vocationally successful, and included other gifted children. Child A was also typical of bright subjects; born at full term, he weighed seven pounds nine ounces, was breast-fed for ten months, increased to 56 pounds at six and a half when 44.8 would be the expected weight, and was 48 inches tall when 46.6 would be expected. He continued his growth rate so that at fifteen years he was about two inches and nineteen pounds over the norm. He remained healthy, slept and ate well, cried little, was threatened by a mastoid infection, had his tonsils and adenoids removed, and wore glasses.

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[5] *Genetic Studies of Genius*, Stanford California, Stanford University Press. Lewis M. Terman *et al.*, *Mental and Physical Traits of a Thousand Gifted Children*, Vol. I, 1925. Catherine M. Cox *et al.*, *The Early Mental Traits of Three Hundred Geniuses*, Vol. II, 1925. Lewis M. Terman *et al.*, *The Promise of Youth, Follow-up Studies of a Thousand Gifted Children*, Vol. III, 1930. Lewis M. Terman *et al.*, *The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group*, Vol. IV, 1947. Lewis M. Terman and Melita H. Oden, *The Gifted Group at Mid-Life: Thirty-five Years' Follow-up of the Superior Child*, Vol. V, 1959.

[6] Leta S. Hollingworth, *Children Above 180 I.Q.*, Yonkers-on-Hudson, World Book Co., 1942.

A began to talk at ten months. On request he picked out letters on the typewriter by fourteen months. At twelve months he said the alphabet forward and at sixteen months said it backward because he was "tired of saying the letters forward." *A* liked to classify and diagram and was particularly fond of mathematics. He learned from his father and enjoyed shortcuts. When he was seven years and nine months he could quickly square any number up to 100 or do series operations such as, "Take 2, square it, square that, divide by 4, cube it, add 17, take the square root, add 7, square it, square it, give the result."

At age three child *A* raised the question of how one is born. To account for his own birth he invented "Center Land" and peopled it with imaginary playmates. He read widely and enjoyed books such as *Miles Standish, The Friendly Stars,* and *On Plymouth Rock.* He was accelerated in school and entered the sixth grade at nine years. His grades were unspectacular—two *C*'s and four *B*'s in the third year of high school.

As a younger child he made attempts to overorganize playmates who had little understanding of groups and rules. He avoided fights but demonstrated courage, affection, and good humor. The case of *A* provides a good illustration of many qualities which are descriptive of giftedness.

Most studies, including those of Terman, show that gifted children are more frequently found in homes where the siblings are bright, where the parents have achieved slightly better-than-average socio-economic conditions and where the occupational rating is above average with most of the parents and relatives vocationally mobile and concentrated in the skilled, managerial, or professional positions. In all of these things *A* is typical. *A*'s immediate family is also male dominant and this was characteristic of the gifted families studied in California. *A* was German-Jewish and in the Stanford studies the parents were Scottish and Jewish in larger numbers than should be expected for the California Bay Area population.

Some of these factors may be only coincident and may have little meaning. Others are obviously significant characteristics of the bright person and his family. Though teachers remarked that *A*'s co-ordination was imperfect, it seems probable that this judgment was made against standards for older children or against A's standards in other areas of development. Generally, physical perfection, health, and rapidity of development are found with superior mental equipment. In one of the early studies Hollingworth and Taylor found consistent increases in weight and height with increases in intelligence (Table 2).

Table 2

Age, Height, Weight Comparisons for Gifted and Dull by Taylor and Hollingworth

	Gifted Over 135 IQ *Median*	*Ordinary* 90–110 IQ *Median*	*Dull* Below 65 IQ *Median*
Age (mo.)	117	117	116
Height (in.)	52.9	51.2	49.6
Weight (lbs.)	74.0	63.9	59.5

Source: Leta S. Hollingworth, *Gifted Children, Their Nature and Nurture*, The Macmillan Company, New York, 1929, pp. 79–87, 92.

Differences in size were also found in the Science Talent Search with entrants larger than their age mates and the winners taller though not heavier than entrants (Table 3). These data are consistent with various studies which show that bright children tend to be tall, broad shouldered and healthy.

Table 3

Physical Status of Male Science Talent Search Candidates

	Av. Height (inches)	*Av. Weight* (pounds)
Highest scoring S.T.S. students	70.31	153.05
Other S.T.S. students	70.01	153.85
Army Inductees	68.14	114.76

Source: Karl C. Garrison, *The Psychology of Exceptional Children*, Revised Edition, The Ronald Press Company, New York, 1950, p. 206.

Children in the California sample were also above average in size, in health, and in health habits. A significantly large number of them were first children. They were heavy at birth; many were breast-fed; nutrition was good; bedtime was early and sleep-time longer than average. They grew taller, heavier, and stronger than their age mates.

Girls showed more physical variation than boys but both were physically above average. They were longer in pubescence and earlier in sexual development than other children (Table 4). It is unlikely that data on group differences in health and physique can be applied to the task of identifying gifted individuals.

Table 4

Comparison of Growth and Health Data for Gifted and Unselected Children

	Boys		*Girls*	
	Gifted/Control		Gifted/Control	
Growth				
Mean birthweight ¼ lbs.	34.0	33.0	30.0	28.5
Walking age ½ mo.	26.0	29.0		
% 12 yr. old-pubic hair	22.0	44.0		
% menstruate before 12			12.5	7.5
Physical Defects				
% frequent headache	2.5	4.5	2.5	5.0
% mouth breathers	24.0	44.0	16.0	31.0
% colds often	43.0	44.00	25.0	41.0
% poor hearing	2.0	6.5	2.0	6.25
% defective vision	20.0	16.0	20.5	16.0
% speech defects	5.0	6.0	.5	.5
% tend to worry	10.0	8.0	13.0	10.25

Source: Lewis M. Terman, *et al.*, *Mental and Physical Traits of a Thousand Gifted Children*, *Genetic Studies of Genius*, Vol. I, Stanford University Press, Stanford, California, 1925, pp. 210–214.

Rapid physical development in gifted children is coincident with the development of intellectual interests and study habits. Gifted children have an extended attention span and with good physical development are able to attend to tasks or concentrate at an earlier point.[7] This development increases the acceptability of acceleration policies. In the Stanford group, the average school-entering age was six-and-a-quarter years and 85 per cent of the children were accelerated during their school tenure. It should also be noted that rapid development causes the child to appear older and more mature than other children of the same age and this maturity may disguise his intellectual capacity. This is particularly the case with Nancy and

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[7] Grace I. Loomis, *Curriculum Bulletin*, Eugene, Oregon, School of Education, University of Oregon, December 12, 1951, p. 4.

Kathy who could easily be bypassed unless teachers and parents were constantly reminded of their chronological age.

The importance of making judgments against age standards is apparent in the Stanford studies. In these studies, 77 per cent of the children were nominated by teachers, 12 per cent were selected because they had good test records, and 7 per cent were first recommended by someone else in the community. To secure nominations for the sample, Terman asked such questions as, "Who was the brightest child in your room last year?" "Who is the brightest child in your room this year?" "Who is the most able in arithmetic?" and "Who is the most able in reading?" After some debate he included a final question which was, "Who is the youngest child in the room?" [8] Though there was a good deal of cross-naming, 19.7 per cent of the total sample were named as youngest and named in no other way. This compares with only 15.7 per cent who were named as brightest and named in no other way. It follows that Terman would have missed one-fifth of the nominated group if he had not asked this final question related to age. His experience cautions us that those who search for giftedness must be sensitive to age differences in children and must be aware that a few months produce great differences in young children.

Developing categories for observation

Intellectual giftedness affects all or nearly all behavior but is more manifest or central in selected ones. When Terman asked parents which clues first caused them to suspect that their children were gifted, they listed: first, grasping ideas or understanding quickly; second, a desire to know; third, memory; fourth, maturity of conversation; fifth, rapid school-learning; sixth, mature interests; and seventh, amount of information. Vocabulary which is usually listed early was well down the list.

The quality of performance must be considered. Psychometrists differentiate between various successful responses on intelligence test items. They appraise the economy and completeness of the response as well as the organization of effort involved in the response. Some guide this appraisal with a threefold question, "Does the subject *take*

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[8] Terman *et al.*, *Mental and Physical Traits of a Thousand Gifted Children*, *op. cit.*, pp. 30–34.

Table 5

Early Indications of Superior Ability Noted by Parents

General Intelligence	*No. of Boys* (282)	*No. of Girls* (237)
Grasps and understands new ideas quickly	50	40
Desire for knowledge	31	31
Retentive memory	21	21
Intelligent conversation	20	15
Rapid progress at school	16	16
Keen general interests	22	9
Range of general information	15	12
Reasoning ability	13	13
Early speech	11	14
Asking intelligent questions	14	11
Ability in accomplishing difficult things	14	11
Keen observation	13	10
Unusual vocabulary	8	12
Originality	3	12
Miscellaneous	4	6
Positive report, without explanation	27	14

Source: Lewis M. Terman, *et al., Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius,* Vol. I, Stanford University Press, Stanford, California, 1925, p. 280.

direction, *maintain* direction, and *criticize* his own approach?" The person truly able for the task begins with a plan, perseveres when the task becomes difficult and is able to look back on his accomplishment with insight and clarity. Typically, Nancy at six years easily mastered the "plan of search" item in the Year VIII Stanford-Binet. This item provides a printed circle representing a field and the subject is expected to draw the path to be followed in searching for a lost article. Nancy picked up the pencil, entered the open side and quickly drew a decreasing spiral. When she finished, she remarked, "Of course I wouldn't cover the whole field unless I'd been over it all when I lost the thing, and I wouldn't finish this path if I found the article first." Her answer is not only correct, it is rapid, planful, and self-evaluated.

This organization factor in problem-solving tends to characterize the highly intelligent performance regardless of the age of the subject. It is absent in the performance of dull people regardless of the simplicity of the task—with the provision that there is no previously learned or practiced approach.

The most commonly recognized clue to high ability is precocious *behavior or early learning.* Stephen recited several nursery rhymes in his second year. He dressed himself and tidied his room before the age of two. At that time he selected among his records and operated the player, and at ten years, when only the general principle of the slide rule had been explained, he was able to multiply and divide within a few minutes. At ten he also read and talked about extrasensory perception, rat experiments in learning, aerodynamics, and morality. All of this was interspersed with the eruptions of boyhood when his explosiveness, irresponsibility, and inadequacy of judgment must surely have caused his parents to wonder if Stephen was really not one child but two. The significant point, however, is that complex and advanced learnings were possible to him and no one can do more than he can do. *Therefore, the most complex behaviors, other than chance, or accidental behaviors, are probably the best criterion for judging his basic ability.*

This precocity appeared in the Stanford studies. The selected children averaged a vocabulary of more than twenty-five words at eighteen months, talked in sentences at 17.6 months and 20.5 per cent of them read before five years of age. In two exceptional cases, boys read in their second year and 6 per cent of all the children read before they were four years old.

Precocious learning is not ordinary learning at an increased rate. This learning comes from limited exposure or few practices and is marked by high-level retention and transferability. Gifted children may seem lazy because comparatively limited contact with a situation is adequate for understanding. Activities suited to children in general quickly lose value for those who perceive so easily. Nevertheless, these children know many things and seem to know them from little experience. They remember well and children in the Stanford studies showed their greatest superiority in their fund of general information. Undoubtedly, this superior knowledge was the result of complex factors, wide interests, ability to read, and good environment but it surely also required a capacity for retention. Finally precocity involves the ability to transfer, to use learning in new situations or to recognize it in altered form. The quality of transferability is the mark of sound learning. It may serve as a criterion to separate glibness or memorized smartness from genuine precocity.

Nancy was a flower girl at a wedding when she was two and a half years old. She traveled for almost twenty-four hours on her first train ride, arrived, met new pepole, spent the night (her first in a motel), went to the wedding, was photographed, attended a formal dinner, and experienced many other new things. Yet five years later, despite all the distractions, she remembers the details of activities and the appearance of people whom she met at that time and has not seen since.

When she was less than four-and-a-half years old she traveled with her parents on a three thousand mile summer trip. Here again were the confusions of new experiences, strange people, strange places, strange means of travel, and the like; yet she can describe in considerable detail the arrangement and colors of furnishings in homes that she visited three years ago. It is even more significant that she was able to adapt one of the decorating ideas for use in her own bedroom.

Precociousness, then, is most often listed among behaviors which indicate high ability. It is not only a matter of task difficulty in relation to the maturity of the individual but involves also rapidity of learning or learning without prolonged practice. It is characterized by acute memory and easy generalization or transfer. Precocious behavior indicates superiority, but the absence of evidence should not be readily interpreted as lack of ability. No judgment should be made unless the child has been in situations which allow and encourage rapid and complex learning. Rapid learners are generally versatile and vital learners. They react quickly and accurately; they note and remember detail; they see underlying principles and relate one event to another.

A second characteristic of superior intelligence is the ability to generalize. A young child says, "Who moke that?" because "break" and "broke" are known and "make-moke" is generalized. At four years and five months, Nancy scored on each of the similarities and difference items at the eight-year level on the Stanford-Binet, Form L. This item asks the subject to tell how two things are alike and how they are different. She said, for "baseball–orange," "One is soft and orange, one is hard and black [correct for old ball] but both are round"; for airplane–kite, "They fly, one is made of paper and the other of something different"; for penny–quarter, "Both buy things but one is smaller." At six years she readily performed on the eleven-year item which asks for a similarity between three things. She said, "A snake, a cow and a sparrow are alike because they are all alive; they're different because they move differently"; "A rose, a potato, and a tree are all plants that grow from the ground"; "A knifeblade, penny, wire are all made of different stuff like iron but it is the same too only I can't think of that name." Her sister, Kathy, at five years easily accomplished the baseball–orange items which require judgment based on shape, color and size similarities, but she was stopped by the complexity of three item similarities based on phyla, material, and function.

In the above items, Nancy was able to generalize by group or class. This generalizing function may be observed very early in the use of comparison. Gifted children compare new things to their previous experiences. They compare colors with their clothes, or noises with the purring of their cat or pleasant feelings with favorite foods. Observers of young children should pay sharp attention to the pointing out of similarities and the making of comparisons.

Definitions of intelligence-testing might begin: "An intelligence test is a controlled and experimental or laboratory observation of . . ." Stephen, at eight years, saw the controls and the experimental approach in the test. He was not told that he was taking an intelligence test. He did not discuss it at home, but two years after testing he surprised the psychometrist with a sly smile and, "Say, how did that experiment on my intelligence come out? I was A-1, wasn't I?"

Ability to generalize and the use of metaphors and similes with early and frequent use of the words *like* and *as* are characteristic of many gifted children.

A third important clue is a complex of exploration, invention, curiosity, foresight, and originality. The California subjects in the Stanford Studies were marked by spontaneity, voracious reading, extraneous information and a multitude of interests. Their multiple interests, their curiosity, and their questions may irritate adults but are as normal to these children as eating and running are to all children. This untempered eagerness may be cooled by personal problems, lock-step schools, or toys that are overcomplete and play that is overcontrolled, leaving no room for imagination, but the persistence of enthusiasm and interests is ordinarily remarkable. Stephen's brother at six, wanted to know, when his father was reading the newspaper, "Which says it, Dad, the black or the white?" (The parent has not revealed the correct answer.) On another occasion the child asked, "If words are things and everybody keeps talking won't they finally fill the world and there will be no place for us?"

A little later, the father, with the acquiescence of a psychologist, arrived home with a small chemistry set for nine year old Stephen. He hoped that the set would keep his son quietly occupied, but there was an error in the plan. The set contained a manual and the first statement was, "Things are material and immaterial." The father's peace was shattered with the piping, "Dad, how could you know if things are immaterial?"

The inventiveness of gifted children covers a wide range. In the California group, 85 per cent of the girls and 51 per cent of the boys enjoyed imaginary playmates. Inventing a "been" or a "foot" that spills the dog's dish or breaks a doll or hides under the bed is closely related to their capacity for vicarious exploration through reading, as reported in the Terman studies. These imaginative functions are commonly found in intellectually gifted children.

Superior children explore and invent without end but they are likely to have an enduring passion for words. Dramatics is a favorite subject, and gifted children are early punsters. One of Nancy's early letters was a drawing of a patchwork design with the admonition, "Don't scrap over this." On her seventh birthday she wrote a thank-you note to her aunt who had made and sent a gift of a red suit. That letter contains the comment, "I like you 'sew' much." Generally these children love to play with sounds and with ideas. This was the case when seven-year-old Nancy wrote and punctuated the following:

The Sheep

A sheep tried on a curly tail.
He then began to weep and wail,
About that comic curly tail.
He took it off to laugh and giggle,
Then he gave a little wiggle
A great bounce and then a jiggle.

When he was 12, Stephen's teacher resigned because she was going to be married. The class gave her a shower and he wrote the card.

We've sure enjoyed your teaching
You've always been such fun.
We're sorry that you're leaving
But your heart at last is won.

You'll soon be getting married
And in the bye and bye—
There'll come a bouncing baby
Then another little guy.

But if your kids are noisy
And shout and raise a fuss
We know that you can manage them
For you have managed us.

P.S. You've landed the fish that you had on the hook—
The least we can do is make sure you can cook.
Here's the book.

In the same year, due to the illness of the recipient, he was unable to deliver a gift of rosebushes on time for seasonal planting so he dashed off a note:

I'm very sorry, you'll have to wait
Your birthday present is by our gate.
The roses, they're in absentia
But, come next spring, we'll have it sent 'yu'.

Childish exploration leads everywhere and sometimes to problems in discipline and decorum. Some adults might feel a little consternation at the delightful, imaginative, and clever production of a girl who was almost eleven years.

How Dogs Become Mutts

When a dog is about six months or a year old it begins to what we call "mate." After the dog mates, it begins to have pups. If the mother dog is a Cocker Spaniel and the father dog is a Red Setter then the pups (puppies) become mutts. But if the mother dog is a Hunting Dog and the father dog is a Hunting Dog then the pups, if any, become Hunting pups. These little puppies are not mutts.

If the mother dog is a mutt when she was born and the father dog was a mutt when he was born then of course the puppies are mutts because the mother and father are the same breed. This is just like the Hunting Dog Family.

Mutts are not expensive like other dogs such as:

Hunting Dogs,
Cocker Spaniels,
Red Setters,
Blood Hounds,
Fox Terriers,
Bulldogs,
Boxers,
Dachshunds,
Seelyhams,
Samoyeds,
Wolf Hounds,
Greyhounds,
Beagles,
Cairns,
Collies,
St. Bernards,

and all those kind. This is because, when a person has a dog and the person lives in a neighborhood with lots of different kinds of dogs it is easily, especially when the person's dog is one kind and there is no other kind of dog exactly the same, it is much easier to let the dog mate with a different dog than to walk all over the state looking for the kind of dog you have. If you do hunt all over you'll get puppies that are a lot nicer than if you let your dog mate with any old dog and get mutts. So if you want mutts it will be very easy to find one. But, if you don't hunt till you find the right kind.

THE END

Kathy Doll

Superior children are serious too and they use language to explore the tender and pathetic emotions. Another ten-year-old girl wrote:

The Unknown Dream

There in the shadows he did stand.
He just flew in with a wave of his hand.
His eyes were blue, he had wavy hair,
And all I could do was sit and stare.
  Then he was gone
  Like a skipping fawn,
He was gone like the flickering candle light,
Gone like the wind in a starry night.

Lynda Abbott

She wrote on another occasion:

Wild Rose

The wild rose in the meadow
Has beautiful rich hues
But when I see the petals fall
I always get the blues.

I think sometimes I'd like to have
A funeral for each rose
But next year when summer comes
Right there, again, it grows.

Lynda Abbott

Originality provides new solutions and new approaches, not always orthodox, not always right, but always intelligent trials. Pete, the five year old, was doing the MAPS (Make a Picture Story) test. For the first item, he was given the background picture of an open and empty closet in an undecorated wall. He moved very rapidly and without pause; picked up the ghost figure, placed it in the closet; next, a man-figure facing the closet and a policeman on the other side. The selection from sixty figures was so rapid that the psychometrist assumed this arrangement was by chance. Then he said, "Tell me the story."

The reply was immediate: "Well, you see, the man opened the closet door and there was the spook. He called the police and the policeman came. He saw what it was." Here there was a magnificent shrug with upturned hands and a full smile. "The policeman said, 'I can't help you. Its a spook.'" The speed, the ability to tell in temporal order, and the joke might hide the fact that this child could draw immediately on the knowledge that bullets had no effect with ghosts. Gifted children are characteristically humorous but their humor is not ponderous, not irresponsible, not sadistic, and not wanton.

If any one ability should be the central characteristic of brightness, it must be the ability to deal with abstraction. This peculiar ability is most likely to be demonstrated in the abstractions of language. Gifted children often experiment not with things but with symbols. Inventiveness, wide interests, and curiosity make the majority of them expert with words.

The fourth characteristic that may be observed is a tendency to self-criticism and moral anxiety. Knowledge and vivid imagination contribute as easily to a sense of danger as to security. Because the gifted child develops rapidly he meets emotional and social problems early, often before the home or school anticipates them. Frequently he must solve these problems without the support and understanding of his age mates. One little boy thought, "If the telephone hears, then it must see." He asked, "Is it watching me now?" Another child was frightened because, "My daddy's mommy went to heaven and left him alone."

When Pete was four he began to talk about death. He came out of a store with his mother. They passed two adolescent boys and got in the car. "Did you hear what that boy said?" whispered Pete.

"No, what did he say?"

"Oh, I couldn't tell you."

The mother now became concerned, "Was it bad? Which boy—the redhaired one?" she asked.

"I don't think his hair is red, it's sort of orange."

Intermittently the question came up, "Are you sure you didn't hear what he said?" It continued till bedtime.

It was the first issue of next morning. "Couldn't you whisper it?" asked his mother.

Then the little-boy part of him took over and he whispered, "That boy said, 'See you tomorrow, if I'm still alive,'" then agitatedly, "Mother, is he? Is he, Mother?"

As the mother talked out Pete's anxiety she discovered the shock that had precipitated his fear. The boy and a friend had been playing on the beach. They dug up a bone and the eight year old pretended to fall dying as he shouted, "You touched a man's bone, you'll die, you'll die." Because the small boy could not make his friend answer, he started running home. The older boy jumped up, caught Pete, and covered his eyes.

When the child's mother explained that the bone was from an animal and that touching a bone was not dangerous, she pointed out that the friend really didn't know as much as she did. Pete said, "Yes, he does, he knows more."

"Why?"

"Because he knows a whole lot more—he's been to school for two years."

The fear of death was talked out and Pete gradually lost his concern about it. Many gifted children have the fears but little opportunity to solve them.

Gifted children are moralists. Many of them weep when they read how their ancestors treated slaves or executed Mary, Queen of Scots, or bombed enemy territory. They accept responsibility, and sometimes guilt, for group actions or failure and usually are strict with themselves. They are rarely profane or lewd. They often set standards for their families and themselves. In his ninth and tenth years, Stephen criticized his parents if they opened a bottle of beer and he insisted that they should not drive that day. He was critical of his family and of himself. When the younger children made social errors, he apologized. When he appraised schoolwork, he said, "Oh, I guess I do all right. I get good enough grades but I'm not satisfied with myself." Then he would elaborate the reasons.

Intellectually gifted children are inclined toward both self-evaluation and a strong sense of responsibility. These qualities may develop because they perceive what is expected or they visualize punishment vividly or they identify with adult standards. Such children often express sympathy with suffering, feel indignity at injustice, seek to rectify their own or other children's social blunders, remodel their own handiwork and express fears over surgery, death, war, and traffic.

The fifth quality on an observation scale might be perseverance. With perseverance might be listed self-confidence. Cox, in the study of three hundred historical geniuses, concluded that perseverance was fundamentally characteristic.[9] Other studies bear out this conclusion, and in the Stanford studies it was found that 9.3 per cent of parents actually hoped to hold their children back. Yet the children pressed ahead. Other studies of expectation level show that people with high ability make realistic estimates of their ability and of their accomplishment.[10] From this realistic self-appraisal they appear to gather motivation. The popular conception of genius does not include stick-to-it-iveness but the informed conception does.

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[9] Cox *et al., op. cit.,* p. 218.

Before school entry, Kathy wanted to read. Nightly, she explored an adult copy of the dictionary discovering words. She persisted for months. The conquest of a "two-wheeler" was approached with the same singleness and durability of purpose. Perseverance and self-dependence based on a shrewd evaluation of her own ability is characteristic of Kathy. Once interested, the gifted child is self-directive and concentrates more adequately than other children.[11] This sustained attention may variously seem to be stubborn, absent-minded or obedient. It undoubtedly contributed to talented, creative, and superior performance.

The sixth observational characteristic is a social eagerness—a desire for adult acceptance and generally a social conscience. Fertile imagination and critical thought should be expected to produce personal-social maturity and excellence. For evidence on this point, we may again turn to the Terman studies. Measurement of personality, moral traits and social maturity was in its infancy in the early 1920's but the investigators made some imaginative attempts to secure data on these matters. Ratings by parents and especially ratings by teachers support the supposition that gifted children are socially mature and conscientious. Table 6 shows that differences in "independence" and "thoughtfulness" are greater than the "social" distinctions. In some of the latter qualities the bright are only slightly more developed than control subjects.

In a study of play behavior, Witty and Lehman found that fifty gifted children participated widely but avoided very competitive and very social activities.[12] These findings are consistent with many other

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[10] Pauline S. Sears, "Levels of Aspiration in Academically Successful and Unsuccessful Children," *Journal of Abnormal and Social Psychology*, 35, No. 4, October 1940, pp. 498–536.

[11] Sister Mary Vernice Makovic, S.N.D., "The Gifted Child," *Special Education of the Exceptional Child* (Rev. William F. Jenks, Ed.), Washington, D.C., Catholic University of America Press, 1953, p. 80.

[12] Paul A. Witty and Harvey C. Lehman, "The Play Behavior of Fifty Gifted Children," *Journal of Educational Psychology*, 18, No. 4, April 1927, pp. 259–265.

EDUCATIONAL

Table 6

Comparison of Gifted and Control Children on Social Traits (after Terman)

Trait	*Per cent gifted at or above control mean*	
	Boys	*Girls*
Prudence and forethought	79	83
Self-confidence	81	82
Will and perseverance	83	86
Sense of humor	72	77
Cheerfulness and optimism	66	62
Permanence of moods	65	61
Fondness for large groups	48	55
Leadership	67	73
Popularity	53	59
Sensitiveness to approval, etc.	58	56
Freedom for vanity	52	53
Sympathy and tenderness	59	58
Generosity and unselfishness	55	55
Conscientiousness	71	74
Truthfulness	72	70
Originality	87	88
Average of these and other traits	70	72

Source: Lewis M. Terman, *et al.*, *Mental and Physical Traits of a Thousand Gifted Children*, *Genetic Studies of Genius*, Vol. I, Stanford University Press, Stanford, California, 1925, pp. 546–547.

observations which show that gifted children are sensitive to the needs of others. When Nancy was two, she visited her grandparents often, two or three times some weeks. Each time she found something to compliment—the cake, a dress, grandfather's shirt or the chimes of grandmother's clock. She sent gifts of flowers from the garden or "wrote" notes to "Granny." This social responsibility touched all of her relationships. One sophisticated visitor embarked on a plane carrying a poorly beribboned bouquet of dying flowers because four-year-old Nancy knew, "She would like something we did ourselves 'cause it's most like us."

An excellent demonstration of social maturity is found in Nancy's behavior before three years. Nancy, her sister, and her cousins were playing in their grandmother's living room. Nancy played well with her five-and-a-half year old boy cousin. The two of them had up-ended the cushion in a large chair so that they might sit, feet on the floor, to drive an imaginary stagecoach over the plains. Nancy's sister and a girl cousin wanted to play so the solution was to make them "top-riders" sitting high on the back of the chair with their feet on the cushion edge. Now a fifth participant approached, a smaller boy always pushed out by his older brother. The older brother denied him the right to ride. Here was a problem and Nancy looked unhappy. How could this be solved without trouble? Suddenly she ran to the kitchen, returned with a kitchen chair, turned it backward at the side of the large chair and said, "Here, you ride here. You can be a post-rider." The dust rose as the entourage wound over the hills. Nancy, like most able children, wanted social goodness and was creative in securing it.

Grouping of clues to intellectual superiority under six heads necessarily excludes many valuable pieces. Learning, and therefore learning capacity, is etiologically related not only to a subject's knowledge but to his feelings, his interests, his skills, his postures, and everything which individuates him.

Observational guides

As late as 1954, Terman was pessimistic about the possibility that intelligence in children would be identified at all, or if at all, early enough for educational acceleration or planning.[13] His doubts have been reinforced by recent estimates which indicate that as few as 5 per cent of high schools have thorough and systematic methods for discovering talent.[14] The first discovery must often come from the hunch of parent or teacher. This requires adults who are sensitive to everyday signs of giftedness which occur in the first five or six years. They cannot observe intelligence but they can observe complex, creative, organized, and rapidly-learned behaviors which demand insight or structuring possible only to intelligent subjects.

Behavioral observations are broadly oriented. A schedule used in Detroit was based on ten factors including group intelligence ratings, height and weight ratios for age, reading comprehension, scholastic marks, the number of permanently erupted teeth, and participation in school activities.[15]

[13] Lewis M. Terman, "The Discovery and Encouragement of Exceptional Talent," *American Psychologist*, 9, No. 6, June 1954, pp. 221–230.

[14] Lyle Spencer, "Implementation—The Effective Use of Identification Techniques," *The Identification and Education of the Academically Talented Student in the American Secondary School* (James B. Conant, Ed.), National Education Association, 1958, p. 40.

[15] Harry J. Baker, *Introduction to Exceptional Children,* New York, The Macmillan Co., 1953, p. 283.

It may be well to use a guide sheet such as the one developed at an early point in the Gifted Child Project of the Portland, Oregon public schools with the co-operation of Reed College and under the sponsorship of the Fund for the Advancement of Education.[16] This rating scale asks teachers to rate children on numerical basis from one to four, from outstanding to below average, on the following traits:

1. Is alert beyond his years. Aware of what is going on, ready to respond to a question or other stimuli.
2. Has keen powers of observation. Sees and notes things in his reading in the classroom and school environment, and in his day-to-day living which are overlooked by the average.
3. Has a high degree of curiosity. Wants to penetrate more deeply into the "whys" and "wherefores"; has an unsatisfied curiosity as the main drive for learning.
4. Is highly imaginative. Less inclined to follow organization and ideas of others. Usually adds ideas of his own.
5. Shows keen sense of humor. Does not reflect emotional insecurity by clowning, but can see the humorous side even though it affects himself.
6. Chooses difficult problems for his years. Is not satisfied with easy and superficial tasks.
7. Follows through on what he himself initiates. Perseveres, is not easily discouraged when faced with baffling problems, has tenacity of purpose.
8. Fulfills responsibilities which are assigned to him. Can be depended upon.
9. Discovers and corrects his own errors. Sets his own standards of high quality.
10. Discriminates between important and unimportant details. Has superior sense as to what is relevant.
11. Can form generalizations and use them in new situations. Employs logical reasoning.
12. Meets new experiences intelligently. Quickly adjusts to change.
13. Has longer attention span. Is not easily distracted.
14. Has deep and varied interests. Does significant things both in and

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[16] Gifted Child Project, Guide Sheet for Identification, Portland Public Schools, mimeographed, January 1958.

out of the school motivated by his own interests and capacity for self-direction.

15. Chooses original methods. Often arrives at correct answers through unorthodox methods.

There is a need to develop better observational techniques because standard tests and traditional judgments do not reach high levels in discovering originality.[17] Whatever instrument is used, the starting place is naturally discrete or separate observations. These include such items as variety of interests, perseverance, curiosity, prudence, early reading, interest in games above the age level, learning from few examples, keen observational capacity, economy of effort in solving problems, enjoyment of academic subjects, good memory, frequent generalization or comparison, long attention span, unusual questions, self-evaluation, original solutions, extended general knowledge, and unusual ability to apply what is known. Once it is determined that a behavior is both observable and predictive of superior intelligence it is necessary to arrange it in some kind of plan or group so that the search for ability will not neglect important areas.

The teacher or the parent will find no observational scale which is universally accepted but will find that scattered observation is less effective than deliberate and organized observation. As a scale is developed it will be apparent that intellectual giftedness is a multidimensional trait. Recent research indicates that creative work in the arts has common attributes with creative work in the sciences.[18] Any group of bright children will be characterized by many specific talents. These are the children who are sensitive to problems, fluent with ideas, able to synthesize and eager to discover new relations. Wherever the search begins the observational guides should show much similarity from one list to another.

The behaviors which indicate giftedness do not occur simply because the subject has ability. They occur because the situation requires or stimulates complex behavior with a large intellective function. A man's reaching-height may be most adequately estimated when a situation encourages him to make the utmost reach and when the

[17] L. Greenberg, "Critique of Classical Methods of Identifying Gifted Children," *School Review*, 63, No. 1, January 1955, pp. 25–30.

[18] Viktor Lowenfeld, "Current Research on Creativity," *NEA Journal*, 47, No. 8, November 1958, pp. 538–540.

observer knows the height or the standard of every shelf. *Giftedness is most likely to be discovered in the environment which encourages intelligent behavior and by the adult who has looked at all behavior in order to locate the pieces which provide for the greatest manifestation of intellectual ability.*

4

Identification by Test

In order to provide for an abbreviated and economical observation and to assure an impartial rating not influenced by social and personal feelings educators naturally turn to tests. In the 1940's, testing and especially intelligence testing was a topic of extended professional debate. The testers proposed that these were vital tools in an objective and scientific education, and the opposition argued that tests deal with the individual in segmented fashion, measuring pieces rather than functional or dynamic differences between persons. Both views have been moderated though some educators continue to emphasize objectivity, standardization, and statistics while others subordinate these values to observation and clinical judgment.

Faith in tests has been renewed with increased attention to academic standards. Tests including tests of academic aptitude or intelligence have been promoted by the National Defense Education Act, the extension of college admission programs, more grouping in the schools, and a generally heightened attention to academic outcomes. Objectivity and large group standardizations as well as administrative practicality and economy are commonly agreed values in tests as instruments for selecting the gifted. Nevertheless, emphasis on testing is rejected by those who argue that unique motivations or special and individualized capacities make persons rather than groups successful. They prefer to evaluate by careful observation over a period of time in a variety of circumstances.

There are inadequacies in tests—inadequacies freely admitted by their creators. However, many objections to tests arise from misunderstanding or from cases of misuse. Intelligence tests are not direct measures of observable things with reasonably well-fixed points of departure comparable to freezing and boiling points. They are standardized observations of behavior from which intelligence may be inferred. The tester does not measure intelligence directly, he judges a sample of performance or achievement and infers what level of ability acted on the environment to produce this behavior. He knows that there is a fairly close relation between native potential and both present learning rate and accrued learning. His inferences must be cautious because the environment may be barren, health or visual handicaps may reduce experience or emotional distraction may limit learning.[1] Some of the shortcomings attributed to tests come from ignoring cautions, breaking standardizations, or overinterpreting the findings.

The advocate of testing urges a practical course. He would produce the best possible instruments on the assumption that changes in behavior are the result of learning. Accordingly, by a process of observation and averaging he sets up standards of performance that may reasonably be expected of individuals at different ages. The tester asks the child to perform in a standardized situation and this performance is compared with what is known to be done by the average child at various age levels. A functional method of reporting this ability to learn is the ratio between the child's age in months and the age at which similar behavior would be average or standard. This ratio is called IQ. In the simplest terms an IQ of 50 indicates approximately that a child does what we would expect from a child half his age. It does not imply that he is half as gifted as average. An IQ of 100 indicates that a child's performance is that expected from a child his own age. An IQ of 135 indicates performance expected of children approximately one-third as old again as the subject. It is simply the ratio that is developed through comparing performance with expectation.

Limited experience with ability tests for the gifted

The earliest motivation in designing intelligence tests was to discover individual limitations in order to admit people to institutions or to exclude ineffective persons from schools or from armies. Binet, the author of the first test in 1905, was infleunced by seventy-five years of work on the part of his countrymen. The largest influence was from his teacher, Charcot, and his co-worker, Simon, but he also drew on much earlier work. Itard and Seguin had searched for both the causes and the cures for mental deficiency and had a special interest in the School for Idiots at Bicetre. The problems of abnormality challenged Esquirol and Pinel. Somewhat later Richet and Charcot tried to understand and treat deviations through hypnosis. Janet sought to enlarge the understanding of normality through a study of the abnormal and Ribot undertook truly psychological studies of mental deviations. The earlier of these studies were directed primarily toward alleviation of handicaps but like the later studies they invariably included attempts to describe and classify deviations.

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[1] John B. Miner, *Intelligence in the United States, A Survey with Conclusions for Manpower Utilization in Education and Employment*, New York, Springer Publishing Co., Inc., p. 110.

Both educators and physicians were eager to describe and measure feeble-mindedness. Then it would be possible to distinguish between insanity and feeble-mindedness. Improved screening devices would assure more adequate care for all deviates through more appropriate institutional admissions or assignments. These interests encouraged study of disabled rather than superior mentalities. They coincided with Binet's practical interests for he was employed to identify those children in the Paris school system who were unable to profit from regular instruction.

Special school classes for the retarded were operating in several cities. They had been tried as early as 1859 in Halle, Germany and were begun in America and other countries before 1900. Binet was convinced of the value in these classes and he sought to make a practical tool suited to assigning students to them.[2]

For many years there had been a hunt for bodily signs of intelligence. There had been investigations of sensorimotor behavior, of skull maps and of head sizes. When measurement through bodily signs or acuteness of perception failed investigators turned to the measurement of psychological differences. These attempts to measure began with no clear concept of the nature of intelligence but with the conviction that it was some inner force which might be inferred from differential behavior. Binet abandoned very precise measures of single abilities in favor of a test which would measure the general

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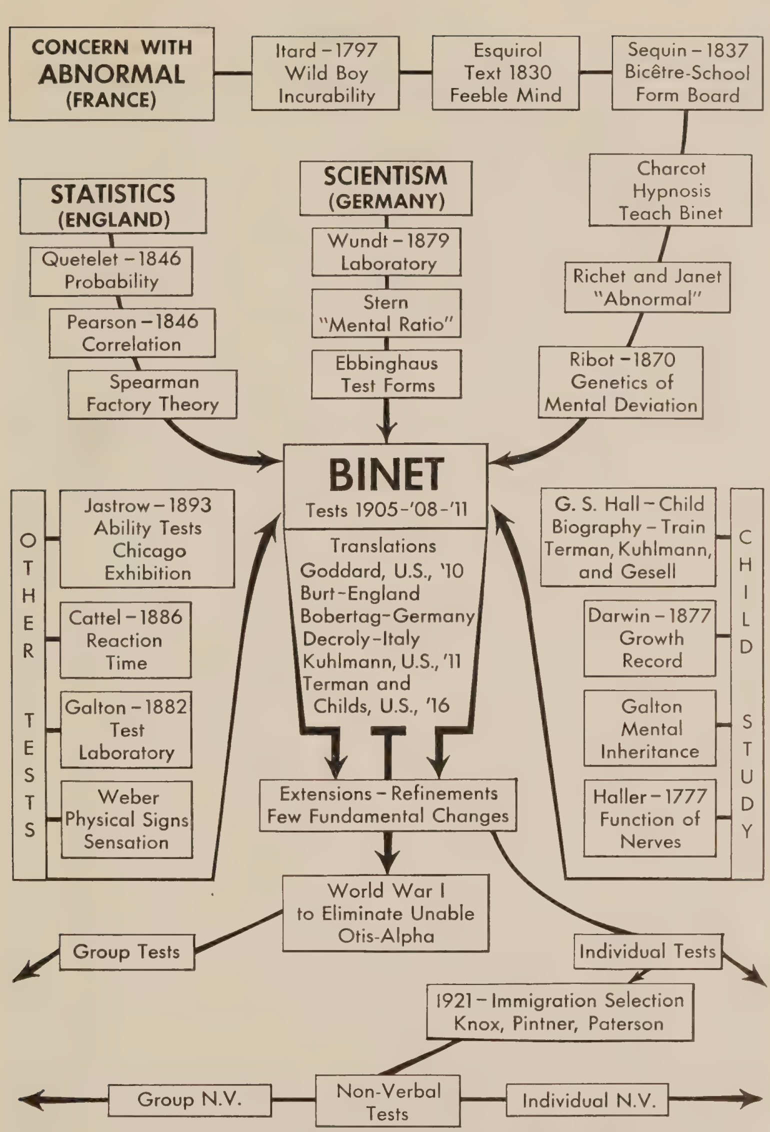
[2] Florence L. Goodenough, *Mental Testing, Its History, Principles, and Applications,* New York, Rinehart and Co., Inc., 1949, pp. 46–48.


CONCERN WITH ABNORMAL (FRANCE)
Itard – 1797 Wild Boy Incurability
Esquirol Text 1830 Feeble Mind
Sequin – 1837 Bicêtre-School Form Board
Charcot Hypnosis Teach Binet
Richet and Janet "Abnormal"
Ribot – 1870 Genetics of Mental Deviation
STATISTICS (ENGLAND)
Quetelet – 1846 Probability
Pearson – 1846 Correlation
Spearman Factory Theory
SCIENTISM (GERMANY)
Wundt – 1879 Laboratory
Stern "Mental Ratio"
Ebbinghaus Test Forms
BINET
Tests 1905-'08-'11
Translations
Goddard, U.S., '10
Burt-England
Bobertag-Germany
Decroly-Italy
Kuhlmann, U.S., '11
Terman and Childs, U.S., '16
OTHER TESTS
Jastrow – 1893 Ability Tests Chicago Exhibition
Cattel – 1886 Reaction Time
Galton – 1882 Test Laboratory
Weber Physical Signs Sensation
CHILD STUDY
G. S. Hall – Child Biography – Train Terman, Kuhlmann, and Gesell
Darwin – 1877 Growth Record
Galton Mental Inheritance
Haller – 1777 Function of Nerves
Extensions – Refinements Few Fundamental Changes
World War I to Eliminate Unable Otis-Alpha
Group Tests
Individual Tests
1921 – Immigration Selection Knox, Pintner, Paterson
Group N.V.
Non-Verbal Tests
Individual N.V.

THE DEVELOPMENT OF INTELLIGENCE TESTING

Figure 1.

level of development. Subsequently, tests have retained the heterogeneous variety of items aimed at the measurement of the general level of ability. They have continued to sample or to sink shafts not into intelligence but into behavior and from these samples estimate intelligence on an age comparison basis.

Test making was also influenced by the acceptance of the scientific method in the study of human behavior. Some 25 years previous to Binet's test Wundt's laboratory in Germany had typified a growing concern for laboratory conditions, for precise instrumental regulation and for standardization. This growing scientism was supported by the statistical and quantitative approach which was especially vigorous in England where in 1846 Quatelet had shown that laws of probability applied also to human data. He found a mathematical means for comparing an individual in one culture with an individual in some other culture. This new tool became invaluable to Galton, Darwin, Spencer, and other students of genetics and evolution. These influences caused test-makers to prize objectivity, standardization, and the expression of results in statistical or numerical terms.

Almost concurrently the belief grew that man could be studied in a scientific way and that these studies should be largely studies of growth increments. This view was promoted by Darwin's work and by the child-study movement. Various people began to keep records of child development and there were several studies of vocabulary growth. Success in keeping growth records encouraged the acceptance of an age scale measurement of development and of intelligence. A summary of historical influences can be found in Figure 1.

Binet drew on all of these ideas and drew, too, on Ebbinghaus' work in the measurement of memory through completion tests. Consequently, Binet's test tends to be a short answer form of noncontroversial items. The items are scored objectively and the rating is stated in mathematical terms against a norm or a standard. Binet's assumptions and questions have been built into most subsequent tests. Tests which were built for a specific function in Paris now serve as models for tests designed for a variety of purposes or jobs. Typical of these jobs were the enormous testing programs of World War I and World War II, both clearly oriented toward identifying intelligence requirements primarily in terms of the minima necessary for adequate functioning.

Special problems in testing gifted children

This attention to minimum abilities is symptomatic of a prolonged lack of interest in excellent ability. The tests which have been designed to function effectively at the lower levels of intelligence are not appropriate to the study of superior children. This is by no means a complete explanation for the shortage of tests appropriate to gifted subjects. The more important explanation lies in the nature of giftedness itself and the difficulties involved in measuring these qualities.

Intelligence might be compared to an inverted pyramid. The pointed base of the pyramid coincides with conception for here is the logical limit of no performance. From that point on the subject increases in complexity, in the number of things he knows and does, and in the difficulty of the tasks possible to him. With increasing intelligence the pyramid spreads rapidly and each behavior becomes more complex. The upper reaches are characterized by creative and abstract behavior. This is much more difficult to measure than simple and rote behavior characteristic at lower levels of intelligence.

Some of the problems met in the development of tests of high intelligence may be suggested in Figure 2. A move from minimum to maximum intelligence is accompanied by a tremendous increase in both volume and variety of behavior. With this growth there is an increase in complexity. The new behaviors include, combine, and add to the simpler ones. *The complex behavior is less closely tied to external and observable behavior.* The inferences concerning ability tend to be unreliable because it is difficult to secure agreement on which of several complex or unique performances is best.

The tester is confounded in his efforts to find stable measures of high intelligence because a major characteristic of brightness is variability. Two dull persons, because they are dull, do anything they can do in a somewhat similar manner. Their choices and methods are few, closely related to habit or previous experience. Their responses are alike and typical of a dull group. No equal commonalty marks the behavior of bright subjects. The behavior of two gifted persons is comparatively divergent, with each one choosing from a range of possible and appropriate solutions. This multitude of choice produces dissimilarity between persons and in the behavior of one person from time to time. It is very difficult to establish a standard or "best" re-

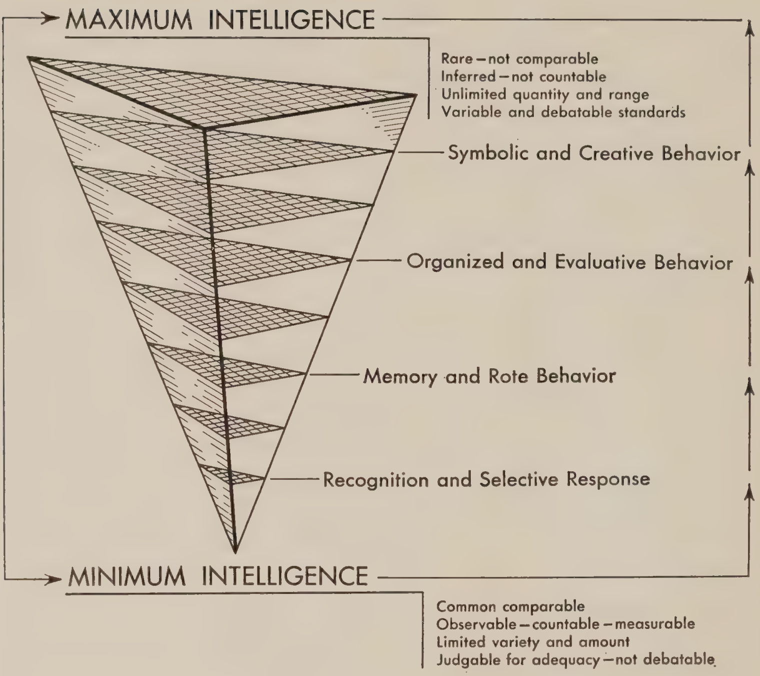

MAXIMUM INTELLIGENCE
Rare — not comparable
Inferred — not countable
Unlimited quantity and range
Variable and debatable standards
Symbolic and Creative Behavior
Organized and Evaluative Behavior
Memory and Rote Behavior
Recognition and Selective Response
MINIMUM INTELLIGENCE
Common comparable
Observable — countable — measurable
Limited variety and amount
Judgable for adequacy — not debatable

Figure 2.

Diagrammatic Explanation of the Increased Amount, Complexity, and Inscrutability of Higher Intelligence

sponse for such subjects. *Standardized questions are not likely to elicit complex and inventive behavior and if they should, there can be no standardized answer.*

Measurements of simple and unidimensional qualities are accomplished with greater accuracy than those for complex and multidimensional traits. Height, for instance, is more readily measured than size and size more readily than personal significance. The same principle can be statistically demonstrated in measures of intelligence. In the standardization of the 1937 Stanford-Binet, reliability was found to decrease with increasing ability. For IQs of 70 the reliability coefficient was .98. It decreased to .92 for IQs of 140. Testers frequently use an approximate figure of 3 per cent of the IQ as a practical estimate of statistical error. Most of these testers increase the proportion rapidly for IQs of 120 and up. Whereas, two or three IQ points account for most errors, twice that amount is not adequate for levels above 140 IQ.

The test is a less adequate sample of total behavior possibilities for gifted subjects. Gifted children are able to do more things and they differ more from one another in interest, specializations, activities, and achievements. The range and the variations in their responses make it increasingly difficult and eventually impossible to assemble a truly representative sample of behavior. A practical and, therefore, a short test provides a much more abbreviated sampling of all the possible learning than the same test provides for less able children. The norms are also less adequate since they are based on less of the total information and since for many tests they were drawn on fewer cases.

Young, gifted children who perform above their age levels are handicapped by limitations in experience or in physical size and coordination. These factors are most important in testing preschoolers. In the *Stanford-Binet Form L,* the eighth-year items involve reading. Average or normal children will have been instructed in reading before they reach this level on the test. The six year old of superior ability who has not been exposed to reading instruction may fail the second item of the eight-year scale. Nancy failed this item at four years and five months of age, though in other functions she was obviously further advanced. Similarly a nine-year-old boy taking the Wechsler noted that the arithmetic items were arranged in sequence. Having performed well on addition and subtraction, he said, "I won't do well when we get to multiplication and division. We haven't had them in school yet." His prediction was correct. He had difficulty with "multiply" and "divide" items and then enjoyed a greater measure of success in later and more difficult items.

At three years and four months, Kathy did not meet the standards for drawing a square which is in year five of the *Stanford-Binet* scale. Consequently, she "failed" the item. Nancy at four years and five months drew very adequate squares but failed to draw the diamond which is in the seven-year scale.

Several tests and especially some of the very short paper-pencil tests have a comparatively low upper limit. In these tests the child proceeds to a point where there is no longer an average against which he can be compared and it is mathematically impossible for him to retain his high IQ as his age increases. On a number of paper-pencil tests the practical top is in the neighborhood of IQ 125 or 130. In these cases it is only possible to say that the intelligence is not below the computed level. This condition might be illustrated by a physical example. If we have a four-foot fence and a boy can barely see over it, that fence provides a reasonable "yardstick" for measuring his seeing height. The same fence provides only an approxmiate measurement for the boy who can place his chin on the fence and is almost useless to measure the basketball star whose height is "six-foot-seven."

All of the errors discussed here as well as errors that result from emotional blocks, physical illness, or cultural bias tend to lower the computed IQ. They almost invariably result in understatement rather than in overstatement. It is unlikely that any significant degree of overstatement is possible. A subject may balk, may refuse, or may fail to do something that is possible for him. He may do less but he cannot do more than he can do. *Thus, it is safe to assume that subjects who score very high on intelligence tests are indeed very able and usually more able than the test scores would indicate.*

Consideration of these or other test inadequacies should not disguise the central issue. The qualities in which the gifted child differs typically from average children are precisely the qualities which tests measure poorly or do not measure at all. The inventiveness and rich variability of response characteristic of superior intellectual functions are not easily measured. It is difficult to draw out the quality of "curiosity" which, used in its etymological sense, means full of care or driven by a need to know. Then there is the passionate devotion to perfection whose reward is not public acclaim but satisfaction with one's own work. Generally, not only do tests fail to measure this quality but they may penalize the youngster who delays too long because he is plagued by an insightful dissatisfaction with his answer. Recently research has turned to tests of creativity and more complex intellectual functions. The National Science Talent Search or Guilford's work on creativity are examples.[3] These are promising studies, but pioneer ones, and we continue to be less able to measure high intelligence than dullness.

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[3] J. P. Guilford, "Creativity," *American Psychologist*, 5, No. 9, September 1950, pp. 444–445.

The values of intelligence tests

That caution is needed in the interpretation of IQ scores does not mean that such a score is worthless. Far from it. The score of a properly administered intelligence test is widely accepted as the best single index of giftedness.

Striking instances of value in intelligence-testing are found in cases where tests uncover high ability which has been dormant and unsuspected. Giftedness is easily discovered in the achiever while equal capacity goes unnoticed in the underachiever. A student who performs most tasks at superior levels must be presumed to be gifted. In such a case, standardized measures of intelligence are valuable but less essential than in the case of the mediocre or inadequate scholar who shows occasional ingenuity or brilliance. It is desirable to discover all ability both functioning and latent. In the latter case, testing plays a vital role.

No branch of the social sciences has contributed devices more carefully constructed, more thoroughly validated or more accurately standardized. Unfortunately, good tests were oversold and especially oversold to school and industrial personnel who were untrained in testing procedure and interpretation. Industry has moved salesmen into personnel departments and schools have retired coaches to the guidance office. Most of them were "good fellas," but to them may be attributed many failures which are currently attributed to the tests. They have not known which tests to use or how to use them.

Any test is not just good; it is good for something. Intelligence tests are good for detecting ability levels up to a point, when other conditions do not limit the function of the subject's ability. Most obviously, paper-pencil tests are inadequate for children who have not enjoyed the ordinary opportunities of reading. Administration of such a test to a handicapped subject is no condemnation of the test but of the tester.

It is less obvious but equally significant that the administration of an individual test to three subjects may result in equal IQ computations for persons of widely differing ability. A computation of IQ 60 might be possible for a testee with average intelligence and very withdrawn personality, or for a testee with brain injury, or for a testee with true intellectual inferiority. A failure to perceive these differences would be very unlikely if the psychometrist were adequately prepared for the testing job.

Objection to the validity of intelligence-testing is usually organized around the example of a subject with measured low IQ who has been a successful and happy citizen. Of course, this is the expected state of affairs! Any community is half-filled with people with something less than average intelligence: good citizens, kindly parents, pleasant neighbors, fine craftsmen, and honest tradesmen. All this is beside the point. Have they demonstrated abstract capacities, been first to infer relationship, and create the new and original?

The other half of the argument, that an occasional very intelligent person fails, is likewise imminently true and equally impertinent to the issue. By and large, the evidence is that gifted children become successful adults, contribute in the professional and creative fields and live happy lives.

Careful study of the problem leads to the conclusion that, with all their limitations, tests are invaluable in the identification of ability. A critical review of mental tests written in 1938 points out the fact that such tests serve immediate and practical purposes as diagnostic instruments for grouping pupils or selecting the best applicant for a job.[4] This practical argument is summarized in a 1950 Statement of the Educational Policies Commission.

> When inquiry shifts from the theoretical to the empirical, the evidence is overwhelming that 1) the level at which an individual is able to score on an intelligence test (in relation to the scores of other individuals of comparable age) remains fairly constant throughout later childhood and youth and probably in adult life, too; 2) ability to score on an intelligence test is related to success in school and college; and 3) individuals who make high scores on intelligence tests in youth are much more likely than others to attain distinction in adult life.
>
> We recommend the use of intelligence tests in identifying gifted children and youth, not because they have been demonstrated to

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[4] Lawrence G. Thomas, "Mental Tests as Instruments of Science," *Psychological Monographs*, 54, No. 3, Whole No. 245, 1942.

measure accurately the inner structure or capacities of human personality, but because they have been found to provide data from which the subsequent behavior of an individual can be roughly predicted. The accuracy of such predictions is far from perfect, but it is accurate enough to justify use of intelligence-test scores, along with other criteria, in such practical operations as identifying gifted students, in making special provisions for their education and in counseling them. Thus, it cannot be claimed that intelligence tests have "absolute" validity; but, for practical purposes, they have a useful degree of "operational" validity.[5]

The relationship between achievement-testing and intelligence-testing

Normally, future behavior is best predicted from recent performance in a like task. Tests of developed ability continue to be the best predictor of performance in closely allied fields, and success in college is closely related to the record of academic success in high school. The gifted child's achievement is likely to be judged in terms of academic success for these are outcomes comparatively well defined and clearly understood. In these narrow terms it should be expected that achievement tests are good indicators of probable success at the next level in the educational program. The facts prove this expectation true.[6]

The performance of a student is based on both innate ability and experience. Both conditions, comparatively unchanged, follow most students from level to level in the school. In the few cases where environment is changed the shifts in relative scholarship are surprisingly small. They are particularly small at the higher educational levels. Achievement tests which measure previous academic progress are suitable indicators of the achievements which are to follow.

While the achievement test predicts with considerable accuracy it does not enjoy the forecast range attributed to the intelligence test. The evidence indicates that intelligence tests can be used to predict college success almost as well at age fourteen as at age eighteen.[7]

[5] Educational Policies Commission, *Education of the Gifted,* Washington 6, D.C., National Education Association, 1950, pp. 41–42.

[6] Henry Chauncey, "Measurement and Prediction—Tests of Academic Ability," *The Identification and Education of the Academically Talented Student in the American Secondary School* (James B. Conant, Ed.), Washington, D.C., National Education Association, 1958, pp. 27–35.

[7] *Ibid.*

Apparently, the intellectual pattern has stabilized and the learning tasks are not unlike those which come in later schooling. From an actuarial point of view, intelligence tests predict large category probabilities such as whether or not the student will graduate from college or will receive honors. For predicting grades in the next level the achievement scores are superior.

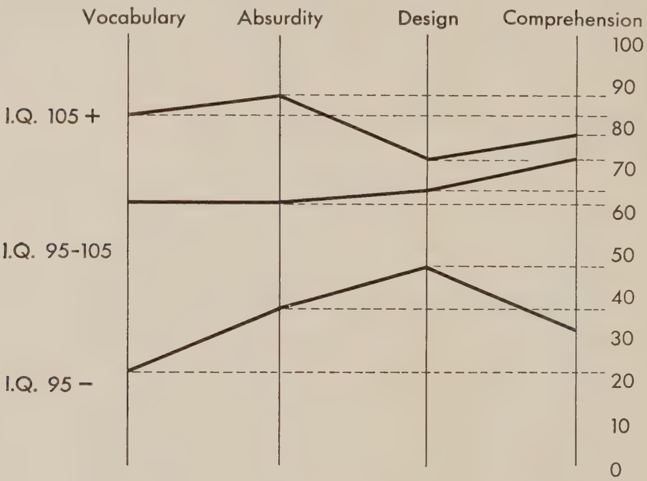

Figure 3.

Per cent of Passing on Selected Stanford-Binet Items for a Group of 10-Year-Olds

Giftedness involves both IQ level and syndromes of qualitative differences. Test-standardizing studies and comparisons of "young bright" with "older dull" children help distinguish "dull" profiles from "average" and in lesser degree "average" from "gifted." Loosely defined and unstable profile differences are found for groups more than individuals. High profile points are for items found to have large general factor loadings. Figure 3 shows that less able 10-year-olds failed in "vocabulary" and "comprehension." Above-average children were highly superior on "vocabulary" and ability to "recognize absurdity" but only modestly above average on "comprehension" and "memory for design." Changes in group, age, or test items would alter these data but certain profiles suggest giftedness.

It may be argued that these profiles are not the result of differential learning rate but rather the result of artifacts in the test. Whatever the cause, we may expect a somewhat similar pattern in achievement tests. Comparison of scores for a gifted group, an average group, and a slow group (Figure 4), might be expected to demonstrate differences in score profiles on four items: *mathematical manipulation*, not problem-solving, *general information*, *reading level*, and *mechanical aptitude*. Able subjects are superior in every item but only slightly so on mechanics and only moderately so in computation. In general information, the gifted differ greatly from the average and even more sharply from the dull. Reading is also distinctively high in gifted subjects. The learning profile differs and some of these differences should be found in the results of achievement tests.

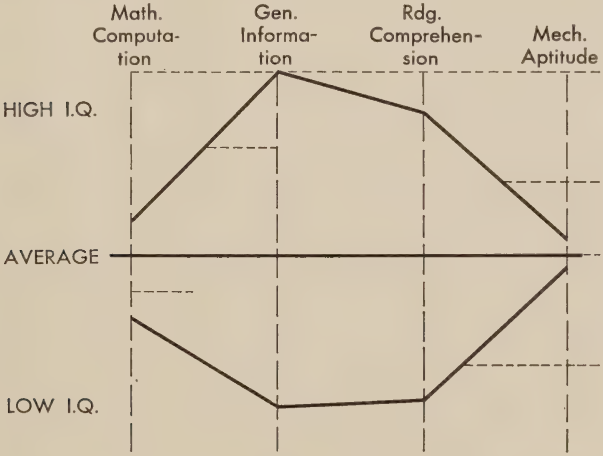

Figure 4.

A Possible Comparative Profile on Learning Different Tasks for Three Ability Groups

There is a paucity of information on the detailed analysis of competence scores. Generally, gifted children do conspicuously well on the more interpretive subscores or categories. Functions which are taught in lock-step fashion or taught so that each person will achieve the minimum are lower-scoring categories for the able. On *California*

Achievement Tests[8] Nancy and Kathy performed from the 97th to the 99th percentile level on "word recognition," "meaning," "interpretations," and other reading functions. On arithmetic fundamentals, largely due to the limitations of experience, they scored at the 95th and 90th percentiles respectively.

There is a need to investigate these differentials. They may come from intelligence itself. They may result from the way different subject matters are taught or from the fact that teachers and test-makers set different standards in different contents. The cause of the different learning profile is not clear but it may serve as a clue to giftedness. In general, it is to be expected that gifted children will be most distinctly superior in general information, recognizing absurdity, reading, and problem solving. The distinction is much less likely to be large in adding, spelling, remembering, hand skills, music, or physical strength.

The achievement profile may eventually provide useful clues to the identity of underachieving gifted students. In any case the combination of achievement scores and intelligence scores is more predictive than intelligence scores alone. Empirical evidence on this conclusion is found in a study of fourteen hundred junior high school students in Pittsburgh.[9] The investigators compared the effectiveness (percentage located) and the efficiency (percentage of nominees found to be gifted) of seven screening devices or selection methods. Children nominated because they were on the student council or because they were competent in art or music appeared on at least two other lists. Teacher-ratings missed more than half of the gifted and almost one-third of those nominated failed to qualify. Mathematics achievement alone missed almost half of the children, and more than two-thirds of the nominees failed to meet the established standard for "gifted." The honor roll was effective because it listed 73.6 per cent of all the gifted but it was inefficient since it listed large numbers of less able children. Group intelligence tests were effective when a low-level criterion score was used, but they failed to distinguish between a little above average and greatly above average. Achievement scores were only slightly less useful than intelligence scores. With the combination of intelligence and achievement scores as a criterion 96.7 per cent of gifted subjects were discovered.

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[8] *California Achievement Tests, Complete Battery, Primary,* Los Angeles, California, California Test Bureau, 1950.

[9] Carl W. Pegnato and Jack W. Birch, "Locating Gifted Children in Junior High Schools—A Comparison of Methods," *Exceptional Children,* 25, No. 7, March 1959, pp. 300–304.

The selection of tests

Educational opinion on testing has moved from the confidence of 1925 through the distrust of 1940 to the caution of 1955. Confidence increased from 1955 to 1960 but a large element of caution continues. A memo from the gifted-child project in Portland, Oregon, proposes the need for a total evaluation which cannot be achieved by intelligence tests alone.[10] This early statement outlines the need for other criteria, especially for those observations which are sensitive to limitations from environmental factors or to abilities in specialized areas. As the Portland project progressed observations were designed in three areas: (*a*) intellectual, (*b*) personality, (*c*) special attitudes.[11] Intelligence tests contributed to the first category but the evidence used was from several tests more than from a single test. Students scoring high on the screening test were then given the Chicago Test of Primary Mental Abilities as a ceiling test.[12] Where desirable, the language factor was reduced through a special administration of the Davis-Eells Games.[13] It was recommended that a decision should be based on nine separate scores. Teachers were further asked to observe such factors as drive, self-direction, creativity, curiosity, individualistic performance and ability to generalize into new situations. After all of this, identification was considered as continuously subject to revision of method and to additional nominations.[14]

The Portland project was also concerned with talents other than intellectual competence though surely this factor was involved throughout. A 1954 report shows a continuous identification program underway.[15] Elementary school observation and testing results were used in recommendations made to high school counselors. After several weeks of observation in the ninth grade, approximately one-third of the class was selected to take the *Ohio State University Psychological Test*[16] as a ceiling test and to provide finer discrimination for the selection of 11 or 12 per cent of the total population deemed to be intellectually gifted.

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[10] Portland Project, Memorandum from the Portland Public Schools and Reed College to the Fund for the Advancement of Education Concerning a Program for Students of Exceptional Endowment, 1952, mimeographed, pp. 2–4.

[11] Portland Project, Gifted Child Project Identification Committee, Progress Report, December 1952, mimeographed.

[12] L. L. Thurstone and Thelma Gwinn Thurstone, *Chicago Test of Primary Mental Abilities*, Chicago, Science Research Associates, 1943.

[13] Allison Davis and Kenneth Eells, *Davis-Eells Games*, Chicago, World Book Co., 1952.

[14] Portland Project, Summary Report of the Workshop on the Cooperative Program for Students of Exceptional Endowment of the Portland Public Schools and Reed College, Portland, Oregon, Portland Schools, mimeographed.

The tendency to depend on several criteria is common. A report from the U.S. Office of Education summarized practices in twelve hundred secondary schools for the 1951–1952 school year.[17] Only in large schools (over one thousand) was the group intelligence test first among techniques used in discovering rapid learners. In most schools course-grades constituted the first criterion. Others that ranked high among twenty techniques were teachers' estimates of school achievement, standardized achievement tests, and information on physical health. All schools tend to use quantifiable information. The security and administrative advantages of these are self-evident. Larger schools use anecdotal information and guidance counselors' appraisal of pupils' interests, aptitudes, and abilities more freely than do small schools. Individual intelligence tests rank far down the scale and are less extensively used to discover rapid learners than they are to discover slow learners.

Almost without exception it is agreed that intelligence tests will not do the whole job.[18] Standardized testing is weak in detecting critical and creative abilities characteristic of gifted persons, but the exclusive use of any one criterion must leave large numbers of gifted children undiscovered. Tests cannot be expected to identify all of the gifted but the fact remains that intelligence tests properly administered and competently interpreted are essential to a selection program. Terman wrote:

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[15] Portland Project, Cooperative Program for Students with Exceptional Endowment, Progress Report II, April 1954, mimeographed.

[16] Herbert A. Toops, *Ohio State University Psychological Test*, Chicago, Science Research Associates, 1941.

[17] Arno Jewett, J. Dan Hull *et al.*, *Teaching Rapid and Slow Learners in High Schools*, Washington, D.C., U.S. Department of Health, Education and Welfare, Office of Education, Bulletin 1954, No. 5, pp. 14–19.

[18] B. Q. Witty, "Does the I.Q. Identify All Gifted Children?" *National Parent Teacher*, 51, No. 6, February 1957, p. 17.

> What I especially want to emphasize, however, is that both the evidence on early mental development of historical geniuses and that obtained by follow-up of gifted subjects selected in childhood by mental tests point to the conclusion that capacity to achieve far beyond the average can be detected early in life by a well-constructed ability test. . . .[19]

In selecting a test, either individual or group, it is necessary to choose between the single score variety or the several scores variety. Intelligence is sometimes viewed as a single quality though one of several dimensions. Other views emphasize intelligence as a multiplicity of abilities. Tests conform to these theories and report either a single or general score or several scores intended to describe the components of intelligence.

For non-specific or general prediction, the total or single score is most effective. The Wechsler scales provide subscores useful for individual cases of diagnosis and prediction. However, most practical school applications use only the three broad or conglomerate scales: "verbal," "performance," and "total." Other tests are also most frequently used in terms of a general or gross score. Colleges throughout the country use the Educational Testing Service instrument, commonly known as the ACE Psychological Test.[20] Though either the *L* (linguistic) or the *Q* (quantitative) score is sometimes used separately for departmental or specific course predictions, the *G* (gross) score is most extensively used for an indicator of probable academic success.

With more definitive analyses of intelligence, schools may find the factor tests increasingly useful. Currently, one may conclude either that testing techniques do not adequately separate factors or that educational techniques are not appropriate to full use of the more detailed measurements. Differential scores seem least valuable for very young children. Component scores become more appropriate for vocational planning or military assignment when the contemplated role requires expert and specific learning and can be described in detail. The occupations appropriate to gifted people are not easily categorized and rarely require specific preparation in elementary or secondary school.

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[19] Lewis M. Terman, "The Discovery and Encouragement of Exceptional Talent," *The American Psychologist*, 9, No. 6, June 1954, p. 225.

[20] *American Council on Education Psychological Examination for College Freshmen* (1952 Ed.), Princeton, N.J., Educational Testing Service, 1952.

Individually administered instruments such as the Stanford-Binet (*Revised*)[21] or one of the several Wechsler Scales[22] are undoubtedly the most accurate, the most definitive and the most clinically useful. The Stanford-Binet probably continues as a standard in good testing practice.[23] Though some of the items have become dated, the technical excellence, the representativeness of standardization, the reliability, and popular acceptance continue this instrument as a favorite for testing between ages six and fourteen years. Critics have pointed out the heavy verbal and scholastic loadings in this instrument but these are ordinarily problems in testing in the lower rather than the higher reaches of intelligence. (A new edition of the Stanford-Binet became available in 1960.) The Wechsler standardizations have been less rigorous and the accuracy of sub-test scores is sometimes questioned.[24] In any case, the differential nature of these scores serves little purpose in describing subjects who are very competent in most fields.

With their shortcomings, tests of this sort are superior to other instruments. They consume so much administration, scoring, and interpretation effort and time that it seems unlikely that they will be administered in any but exceptional cases. Their use is advocated in cases where other data appear in conflict or in cases where group measurements indicate intelligence beyond the level of the paper-pencil test.

In other cases, schools will be dependent on mass or group testing. Following the development of group tests in World War I, similar tests were introduced to schools, business, and industry. These tests are loaded with tasks of an academic nature and are predictive of school success rather than of general performance. In the case of the gifted, this is less of a problem than is cultural bias, lack of creative possibilities, and lack of "top" or effectiveness in making distinction between different levels of high ability.

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[21] Lewis M. Terman and Maud A. Merrill, *Stanford-Binet Intelligence Test*, New York, Houghton Mifflin Company, 1937.

[22] David Wechsler, *Wechsler Intelligence Scale for Children*, New York, The Psychological Corporation, 1949.

[23] Goodenough, *op. cit.*, p. 315.

[24] Anne Anastasi, *Psychological Testing*, New York, The Macmillan Co., 1954, pp. 306–325.

We may not reasonably expect one test to measure many things well. If a test is excellent in categorizing deficiency it is most likely to be highly unsuited to measuring high intelligence. Some guiding principles for the selection of group tests would include:

1. Tests suited to measurement of severe handicap and confined to fewer operations such as Goodenough Draw a Man Test,[25] the Raven Progressive Matrices Test[26] or the Columbia Mental Maturity Scale[27] are not suited to measurement of superior ability.
2. Tests such as the S.Q.T. (Scholarship Qualification Test)[28] appropriate for high-level ability function poorly in the lower half of the class.
3. Performance and non-language tests, because they are limited, are less likely to be effective than ordinary group tests.
4. Among limited or single function tests, the most successful are those of major verbal difficulty such as the Ohio State University Psychological Test, the Miller Analogies Test,[29] the California Analogies and Reasoning Test,[30] or the Concept Mastery Test.[31]
5. Lack of discrimination at high-level intelligence reduces the value of differential description through sub- or part scores and profiles.
6. Any test and especially any group test indicates rather than measures high-level ability.

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[25] Florence L. Goodenough, *Measurement of Intelligence by Drawings*, Yonkers-on-Hudson, World Book Co., 1926.

[26] J. C. Raven, *Guide to Using Progressive Matrices*, London, H. K. Lewis and Company and George G. Harrap and Company, 1952.

[27] Bessie Burgomeister, Lucille H. Blum, and I. Lorge, *Columbia Mental Maturity Scale*, Manual of Directions, Yonkers-on-Hudson, World Book Co., 1953.

[28] *Scholarship Qualification Test*, Eudcational Testing Service, 1956.

[29] W. S. Miller, *Manual for the Miller Analogies Test*, Form GNY, New York, Psychological Corporation, 1947.

[30] Claude Mitchel, *California Analogies and Reasoning Test*, Los Angeles, California Test Bureau, 1958.

[31] Lewis M. Terman, *Concept Mastery Test*, New York, Psychological Corporation, 1950.

Total observation

The argument for multi-observations, including those of teachers and parents as well as the standardized ones that come from testing, often finds support because it appears as a kind of compromise. In reality, it does not constitute compromise. Superior intelligence is manifested in many dimensions and is not adequately measured on any single behavior. Valid judgment must recognize the interrelatedness of evidence from numerous sources.

In the total judgment, the intelligence test serves as a threshold measure. It indicates that a subject has passed the lower limits of giftedness more than it provides for distinguishing between the degrees of giftedness. This is a smaller limitation than it might appear. Beyond a minimum criterion or floor level we are uncertain about the function of static intelligence.[32] Above a gross minimum or cutting range, educational or occupational success seems to be determined mostly by non-intellectual factors. Under this range failure is likely but above it, increments of success are not closely related to higher intelligence-test scores. Knowledge on this point is very limited but it combines with our knowledge of test limitations to support the view that IQ scores serve best as evidence of minimum competency.

Nearly thirty years ago, Hollingworth concluded that children selected by mental tests demonstrated most of the characteristics of historically famous men.[33] She maintained that intelligence provides for adaptation and a group selected for any superiority or excellent adjustment will demonstrate other desirable traits. A recent manual on identification lists zeal or enthusiasm as a characteristic of the able leader, the scientifically able, the artistically able, the mechanically able and the dramatically talented.[34] Advancement in academic work is listed as common to the intellectually able or the scientifically able. There is repeated manifestation of this wide conjunction of excellences. National Merit Scholarship winners were first screened by test. The finalists were "many-sided." Their interests and abilities included skin diving, track, football, model railroading, mathematics, dancing, chemistry, and hunting. Interest and ability are fundamentally related. Extensive ability leads to extensive interest and widely-spread competencies.

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[32] David C. McClelland, "Issues in the Identification of Talent," *Talent and Society: New Perspectives in the Identification of Talent*, Princeton, N.J., D. Van Nostrand Co., Inc., 1958, pp. 12–14.

[33] Leta S. Hollingworth, *Gifted Children, Their Nature and Nurture*, New York, The Macmillan Co., 1929, pp. 17–30.

[34] Jack Kough and Robert F. DeHaan, *Teacher's Guidance Handbook, Vol. I, Identifying Children Who Need Help*, Chicago, Science Research Associates, 1955.

The observer must be aware that not all characteristics which describe a gifted group will be found in each of its members. Gifted people tend toward individuality or uniqueness. Their common qualities are fewer and less universally present than are the qualities characteristic of dullness or some other psychological state. Indicators of high intelligence must be used more tentatively and categories less rigidly than predictive characteristics might be applied in some other group. Terman and his associates cautioned against the superficial judgment of individuals on the basis of group variabilities.[35] Pupils should not be eliminated from a gifted group simply because they do not perform at outstanding levels on any one quality or category.

Practical considerations make it necessary to organize or categorize observations. A schematic pattern might look like Figure 5. This figure indicates that bright subjects are ordinarily developed beyond average levels in most areas. If the center of the circle is "no development" and the circumference of the inner circle is "average," then the gifted person is outside or beyond the average circle in almost every observation.

The greatest deviation from average lies in behaviors having as a major component that intellectual function often called insight or understanding. In this category of behaviors the greater distinction lies in problem-solving and organizing; least distinctive are the mechanical and hand skills. Gifted persons also differ in heredity and origin. They have more gifted siblings, fathers above average in occupational status, and more books in their homes. The most measurable differences are those of health and development. In these, the greater differences are those of height and early sexual maturity. They do not differ greatly in motor ability or in history of contagion. Intelligence functions in social and character development, and while

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[35] Lewis M. Terman *et al.*, *Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. I, Stanford, California, Stanford University Press, 1925, p. 631.

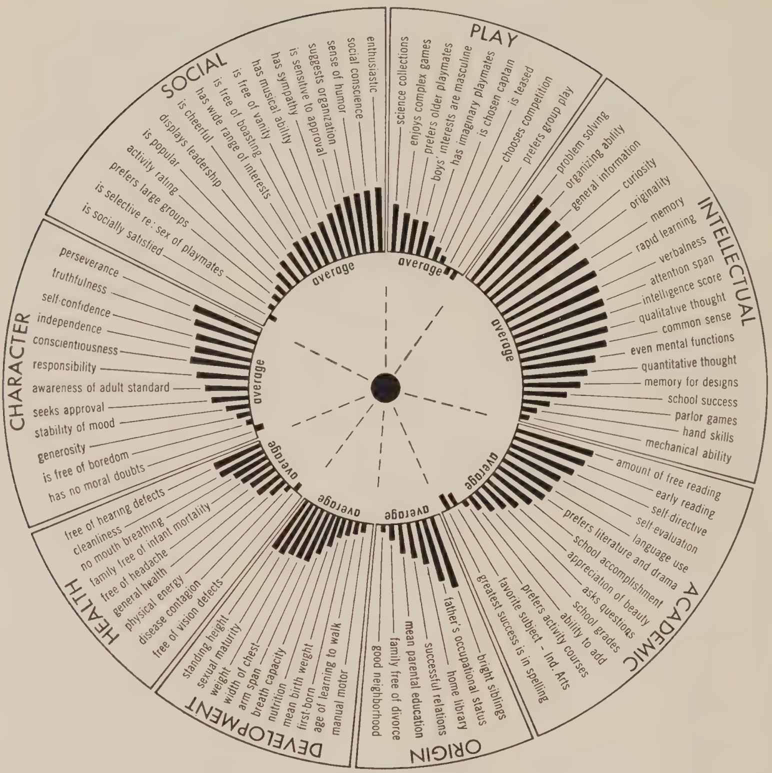

Figure 5.

Schematic Profile of "Average Gifted" Compared with Characteristics of "Average" Children.

gifted children may sometimes be burdened by doubts and dissatisfaction, they are in general enthusiastic, humorous, persevering, trustful, independent, and sympathetic. These qualities combine to increase their academic success. They are less likely to enjoy or prefer the rote subjects and most likely to enjoy the creative and organizational parts of their schooling.

None of the observations, whether by test or by ordinary observation, can be adequately made by untrained persons or in casual fashion. The value of any observation is increased when the interpretation of evidence is conditioned by the interrelationships of all the evidences. Single clues, single observations, or a single test necessarily fails to identify some members of a group who are characterized by imagination, wide interest, resourcefulness, inventiveness, and variability of behavior.

THE CHARLES G. REIGNER
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PRINCETON THEOLOGICAL SEMINARY

5

Genius, Talented or Gifted

> A work of art, no matter how sublime, is yet a work of human mind and human hands. It should, therefore, fit into the orbit of human intellect.
>
> Frederic Taubes, *Anatomy of Genius* [1]

Discussions of giftedness at Elm Road School lead inevitably to questions on the nature of talent and the quality of genius. These are promising pursuits if teachers should find that talents are specialized brightness and that genius is an extreme form of brightness. Should this be the case, they would find in the behaviors and achievements of world-recognized geniuses some of the characteristics which might be developed in bright children. Should this not be the case, the clarification of differences which lie between genius, talent, and giftedness may help in the discovery of educational methods appropriate to each group.

Mr. Anderson, the principal of Elm Road School, is aware that parents are more amazed by what they call genius and talent than they are by what they call giftedness and that genius and talent are assumed to be inherited qualities not readily altered by school experience.

When Mr. Anderson examines this question he finds that the terms "genius," "talented," and "gifted" imply aptness—either an aptness which is secured without effort or an aptness which makes practice highly effective. This unmerited adroitness is ordinarily attributed to nature rather than to culture. Genius implies an exalted kind of mind which leads to original work of such quality that it is permanent and has nearly universal influence. Talent is used to suggest less incomparable ability and narrower cleverness. This special fitness may or may not be original, may or may not have universal effect and is of notably less transcendent proficiency. Giftedness is less well defined than the other terms; like genius it ordinarily deals with intellectual quality but like talent, it does not imply pre-eminence.

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[1] Frederic Taubes, *Anatomy of Genius, A Guide to Understanding and Intelligent Judging of Painting,* New York, Dodd Mead and Co., 1948, p. 8.

Mr. Anderson knows that if these differences are only matters of degree or of specialization, a study of one quality will illuminate the others. If the qualities truly differ, a study of them will help him to understand his pupils. In either case it seems likely that some examination of the question will assist him in his responsibility toward a child like Pete who is gifted or bright and who is at the same time very able or talented in verbal expression, in music, and in social relationships.

A Look At Genius

A study of genius leads to history books, for these are largely records of greatness. However, these books are filled with a confusing multitude of explanations for greatness. Enduring explanations of genius include Plato's idea that genius results when gods or demons act through humans. Plato held that the poet is a "holy thing and there is no invention in him until he has been inspirited." Socrates also held that the works of genius were unnatural "intimations from the spirit."

A second hypothesis, popular from ancient times to our own century, attributes genius entirely to genetics and holds simply that such men are a different kind or a different species. A contemporary writer has said, "Genius can be defined only in terms of its own unique mental and temperamental processes, as man differs from the ape—a psychical mutation." [2]

A third view explains genius as the product of social forces. The "new creation" is attributed to complex sociological circumstances and not to individual invention. The idea that the person of genius is determined by accident or circumstances is held by Lange-Eichbaum, who says, "They simply happen to be there at the time when something of value to many thousands comes into existence."[3]

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[2] Nathanial D. Hirsch, *Genius and Creative Intelligence,* Cambridge, Massachusetts, Sci-Art Publishers, 1931, p. 298.

The Elm Road staff would reject "pure" explanations in favor of those which combine the influence of biological nature and sociological nurture. A few teachers would accept Galton's idea, drawn from extensive studies of individual differences, that (*a*) "No man can achieve a very high reputation without being gifted with very high ability," and even more significantly, (*b*) "Few who possess these very high abilities can fail in achieving eminence."[4] Other teachers ally themselves with a view developed by sociologists and reformers in the 1880's. They emphasize the value of experience and the veto power of environment. A moderate statement of this position proposes that recognized geniuses might have failed in other environments or in other periods of history. Their situation has been compared with factors in the production of biological variations.[5] While environment does not produce such variations, it may destroy them or prevent their development.

The prodigy

Some popular conceptions of genius are drawn from anecdotes and particularly anecdotes concerning child prodigies. A typical story is that of Christian Heinrich Heinekin, the good-humored, lovable, unhealthy son of a German artist. Tutored from the age of ten months, his interest in ideas caused him to neglect his food. At ten months he named objects in pictures and by fourteen months knew the stories of the New Testament and at least some of the Old Testament. At four years he read German, knew French, and had memorized fifteen hundred sayings in Latin. He died at fifty-two months and at least in his early death lived up to the stereotype of genius.

Popular stories support the supposition that genius died early and was physically inco-ordinate or weak. "Early ripe, early rot" was a popular conviction though many of the anecdotes denied this view.

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[3] Wilhelm Lange-Eichbaum, *The Problem of Genius*, New York, The Macmillan Co., 1932, pp. 10–11.

[4] Francis Galton, *Hereditary Genius, An Inquiry into its Laws and Consequences*, New York, The Macmillan Co., 1925, p. 43.

[5] Catharine M. Cox *et al.*, *The Early Mental Traits of Three Hundred Geniuses*, *Genetic Studies of Genius*, Vol. II, Stanford, California, Stanford University Press, 1926, pp. 13–16.

One of the prodigies, Karl Witte, was strong, active, social, and unpretentious as well as intellectually keen for all eighty-three years of his life. Estimates of his intelligence are upward from IQ 180. He read fluently at four. In a public demonstration, at seven years and ten months, he read Italian, French, Greek, and Latin. At eight years he enjoyed the original texts of Homer, Plutarch, Virgil, Cicero, Fenelon, Florian, Metastasio, and Schiller. Matriculated at Leipzig at nine years, he received his Ph.D. before 14, and his boyishness and manishness were "so normal" that Karl's father attributed his unusual qualities to education rather than to any personal uniqueness.

Favorites among the stories are those of dunces who grew to be geniuses. Pasteur, Darwin, Hume, Churchill, Goldsmith, and Newton share, at least in retrospect, a reputation for dull or borderline school achievement. Some of the stories are false, others imply learning problems, when actually the difficulties were those of interest and discipline. Schools adapted to less able students are likely to be too filled with drill and rote memorization to challenge youngsters of such rare ability. Despite the stories, such cases were and are the exception. Typically, gifted subjects achieve well in school, though not necessarily up to ability.

John Stuart Mill, the humane liberal in British political philosophy, is estimated to have had an IQ above 190 and beyond six standard deviations above average.[6] He successfully dealt with a rigorous, intense and rapid education under his father's direction. He studied Greek at three, Plato at seven, and Latin at eight. By nine years he was reading the *Odyssey*, Theocritus, Pindar, and Livy. At nine, conic sections, spherics, and Newton's arithmetic were added to geometry and algebra. With astronomy and mechanical philosophy (physics) in his curriculum since ten, he began the study of philosophy and logic at twelve. All this included daily written reports and daily debate with his father. He wrote a history of Rome at six and a half, a synoptic table of Aristotle's rhetoric at eleven, and before seventeen published letters in defense of his father's political views. He was precocious, intellectually mature, academically successful, and widely interested.

At 20 years, John Stuart Mill experienced a nervous breakdown. His superior insight enabled him to understand his ailment and select a therapy. He recognized that he had become a "reasoning machine" and turned to music and poetry to develop his emotional life. That he could so adjust himself is amazing, but that he should have emotional difficulty is not surprising. James Mill, his father, not only treated him like an adult, but denied him any childhood and apparently looked down on his mother. The boy was allowed to associate only with his father and with his father's friends.

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[6] *Ibid.*, pp. 707–710.

Despite the harshness of his training he used his prodigious learning for active human purposes and in a quest for positive remedies such as the popular vote, women's rights, universal education, proportional representation, and free discussion. Far from being the withdrawn "ivory tower of genius" of popular fancy, he was the strenuous advocate of warm and compassionate political theory dedicated to the elimination of human exploitation and degradation. Raised in a tough, unyielding atmosphere of agnosticism and rational materialism he became a champion of democracy and a tender but determined reformer. His history is detailed and well documented, an excellent picture of genius.

The historical view

Genius is often defined in cultural terms. Before the title is conferred a long period must elapse, a period during which much evidence is lost and much of what is left becomes distorted in biography or autobiography. The recognition of genius involves the relationship of the person with his contemporaries and with posterity.

Writing in the 1930's Lange-Eichbaum insisted that "Geniuses are created by mankind at large." [7] He attributed the making of genius to the admirers and argued that fame was so essential that an unrecognized genius was impossible. Educators may reject such a strong emphasis on the sociological factors contributing to genius but they must recognize that the title "genius" implies social recognition. It is granted, in part by historians and in part by the folk who have been impressed. Since particular forms of behavior are valued quite differently and even contradictorily in different cultures and different periods, there is no agreed standard for genius.

Are there, then, identifiable qualities which have won universal recognition? It would be illogical to conclude that geniuses can be identified by some unchanging and common intellectual capacities if there are no common characteristics in their work. A non-definitive and rapid search for such characteristics might begin with a study of names given extended recognition in any encyclopedia. The top fifty would almost certainly include Shakespeare, Homer, Plato, Aristotle, Michelangelo, Bismarck, Francis Bacon, Marx, da Vinci, Bach, Jesus, and St. Paul. There would be a great variety in such matters as race, birthplace, time, and fields of endeavor. However, those famous only for physical prowess are less likely to be there. It scarcely supports the dictum of Thomas Wolfe that genius is a golden thread running through the life of Babe Ruth as truly as it does through Shakespeare or Aristotle.[8] Neither would the list include many who were famous merely for the reproduction or performance of works created by others. The list may also be short on jacks-of-all-trades, the Michelangelos, the Franklins, and the da Vincis. This may indicate only that recognition is ordinarily narrow and that genius is most readily accorded to one who is outstanding in a single field.

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[7] Lange-Eichbaum, *op. cit.*, p. 11.

What are the common qualities? One of the first names on the list is Shakespeare. He is in a literary group including Homer, Johnson, Moliere and Euripides. All of these used language effectively. Here is a quality which teachers will associate with intellectual superiority; yet facile use of language does not in itself warrant a place in the group. It is remarkable that all of the literary group are read with pleasure and satisfaction decades and even centuries after their deaths. Their stories and songs surpass contemporary popularity and achieve durable reputation. The writings appear truthful and complete in the sense that they evoke emotions and convictions of universal validity.

Plato, Spinoza, Kant, and Comte will probably be found in a second group—philosophers. If literary men are accorded a quality of universality, surely philosophers must be also, for their distinction lies in ability to discover principles which are used to solve the basic and persistent problems of mankind.

A third group may seem to be the product of social circumstances rather than of personal ability. This group will probably include Napoleon, Bismarck, and Cromwell—military politicians. Perhaps their ability was not obviously intellectual; nevertheless, their policies had long range and international effects. They were strategists rather than tacticians and it seems possible to find a quality of universality or generality in their effect on history.

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[8] Thomas Wolfe, *The Web and the Rock*, New York, Harper and Brothers, 1939.

A fourth group will probably include Bach, Beethoven, and Handel, composers rather than performers—composers who effected considerable and enduring changes in the structure of music.

Gifted children *abstract*, *generalize*, and *express*, or represent in symbols. Are these also characteristic of genius? May Mr. Anderson conclude that a genius abstracts in the sense that his work is not tied to a particular place or date, generalizes in the sense that his solutions are applicable to the widest range of problems, and expresses in the sense that his ideas find wide acceptance and timeless meaning?

Numerous studies help to answer this question. Galton's studies of *Hereditary Genius* (1869) and *English Men of Science* (1874)[9] are perhaps the best known. These were followed by William James's "Great Men, Great Thoughts, and the Environment" (1880), Yoders' "A Study of the Boyhood of Great Men" (1894), and Lombroso's *The Man of Genius* (1891).[10] French studies were done by DeCandolle in 1873 and Odin in 1895.[11] More recent and more widely known are the American studies of Cattell, "A Statistical Study of Eminent Men" (1903) and *American Men of Science* (1921), and the British study of Havelock Ellis' *A Study of British Genius* (1904).[12]

Cox's study, *The Early Mental Traits of Three Hundred Geniuses* (1926)[13] is undoubtedly a classic in the field. This work indicates that the recognition of genius is related to the time in which the person lives. In the basic group of 282 men, 51 per cent were from the eighteenth century. It is probable that this weighting is partly due to nearness in time and social goals, partly due to more accessible records. This scarcely seems an explanation of the total sample since there were 70 per cent more cases in the first half of the fifteenth century than in the last half, and almost 40 per cent more in the first half of the seventeenth century than in the last half. Apparently certain historical periods are particularly productive of recognized genius.

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[9] Francis Galton, *Hereditary Genius, An Inquiry into its Laws and Consequences*, 1869, and *English Men of Science*, 1874, London, The Macmillan Co.

[10] William James, "Great Men, Great Thoughts, and the Environment," *Atlantic Monthly*, 46, No. 276, October 1880, pp. 441–459; and A. H. Yoder, "The Study of the Boyhood of Great Men," *Pedagogical Seminary*, 3, No. 1, October 1894, pp. 134–156, and Cesare Lombroso, *The Man of Genius*, London, Walter Scott, 1891.

[11] A. DeCandolle, *Histoire des sciences et des savants depuis deux siecles*, Geneve, 1873, and A. Odin, *Genese des grands hommes des lettres francais modernes*, Paris et Lausanne, 1895.

[12] J. McK. Cattell, " Statistical Study of Eminent Men," *Popular Science Monthly*, 62, February 1903, pp. 359–377, and J. McK. Cattell, *American Men of Science*, New York, Science Press, 1921, and Havelock Ellis, *A Study of British Genius*, London, Hurst and Blackett, 1904.

[13] Cox et al., *op. cit.*, pp. 3–842.

The Cox sample is consistent with the supposition that expression of abstractions or generalizations which have value to society determine eminence. In the sample, 18 per cent are imaginative writers, 15 per cent other writers, 15 per cent statesmen and politicians, 8 per cent religious leaders, 8 per cent philosophers. Another 12 per cent are characterized by unusual ability to express. They are artists, musicians, and revolutionary statesmen. Those who write, talk, develop formulas, or compose music leave their own record for society and, in effect, write their own histories whereas other productive geniuses leave less adequate evidence of their work.

Negative interpretations

Negative views of genius are frequently drawn from history. Some of these hold that genius results from compensation. Unusual achievements are attributed to imbalanced attention toward a single aspect of life. Genius is seen as the product of exaggerated development of one faculty at the expense of others. It is assumed that this occurs when some basic incapacity or lack of success in physical and social realms leaves a surplus of energy for artistic and intellectual achievement. This opinion comes mostly from folklore but receives support from a few historical studies of genius. Lombroso believed that pallor was the natural color of great men and that they were marked by emaciation, grayness, baldness, brain lesions, stammering, lefthandedness, sterility, and other physical inferiorities.[14] Havelock Ellis in *A Study of British Genius* concluded that genius involved (*a*) an unusually sensitive and complex nervous system, (*b*) organic or physical ineptitude preventing ordinary adjustment, and (*c*) concomitant defects.[15] These data are in conflict with findings from Terman and others but they have been widely read and accepted.

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[14] Lombroso, *op. cit.*, p. 7 ff.

Closely allied with this view is the belief that suffering, physical illness, or approaching death may encourage creativity. Jeanette Marks writes, "About to perish Nature sees that mind burns the more brightly." [16] She proposes that the sensitive mind about to be destroyed seeks to produce art which nears the immortal and may worthily be preserved. She also says that poverty and pain have saved many great minds from lethargy. "It was tragedy reagent that kept James Thompson from sinking into the fat lethargies of English sentimental poetry." [17] Those who believe that genius is cultivated in unhappiness need take but a short step to the belief that geniuses are likely to comfort themselves with indulgence in sexual abnormality, in drugs, or in alcohol.

There is a rather common conviction that genius lacks tact, moderation, and practical sense. These limitations are assumed to be necessary correlates of genius because a strong passion or zeal is necessary to genius. Good sense, logic, and weighing of all factors is thought incompatible with such zealousness and passion. Kretschmer argued that genius was never a simple matter of taking pains and that, "scientific and inventive genius is industry under the sway of an overvalued idea." [18]

These views have been exploited through the ages and many parents are harassed with the fear that dreadful unhappiness will be the lot of their gifted children.[19] Such parents may resist the development of unusual intellectual or artistic skill. They are overattentive to small eccentricities and they talk these into a reputation which interferes with the child's natural relationships.

A second group of views emphasizes intuition, the subconscious elements in creativity, and the belief that art comes from sublimation.

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[15] Ellis, *op. cit.*, pp. 227–233.

[16] Jeanette Marks, *Genius and Disaster, Studies in Drugs and Genius,* New York, Adelphi Co., 1925, p. 132.

[17] *Ibid.*, p. 121.

[18] Ernst Kretschmer, *The Psychology of Men of Genius* (translated by R. B. Cattell), New York, Harcourt Brace and Co., 1931, p. 139.

[19] Ruth Tunley, "What About Those Child Prodigies," *Coronet,* 39, No. 6, Whole No. 234, pp. 65–68.

These views assume that genius arises suddenly, mysteriously, and uncontrollably from some subterranean layer where the primitive inner man has not been dulled or quieted by fact or by thought. In this view artistic or creative insights are facilitated by conditions which reduce intellectual and social controls. Intuitive wisdom and inspiration are presumed to rise most readily in the uninhibited person and to find their source in naturalistic and untamed drives, especially the drives of sex.[20] Ascetic and logical persons are thought to be uncreative, only able to perpetuate knowledge or to make static contributions to civilization. Creative intellect is presumed to be an expression of sexual appetite or at least closely correlated with it. To support this view there are several famous cases of artistic decline which accompanied the decline in the artist's sexual activities or physical energy. Kretschmer and others, including some modern writers, emphasize the periodicity which appears in the lives of famous men, attempting to show that creativity is closely related to a curve of sexual energy.

Such views discount the value of educated intelligence. As Gurko says, "In the prevailing view, intelligence and intuition seldom appear together." [21] If knowledge and intelligence are so unrelated to inspiration there is little need for learning, for effort, or for perseverance. There is only a need for patience, waiting for an explosion in the subconscious which will then give sudden shape to the imagination. Such a position is anti-intellectual, giving small place to reason or to logic. If this seems to be a caricature or an overstatement of the view one might examine words of Henri Bergson who wrote, "The intellect, so skillful in dealing with the inert, is awkward the moment it touches the living." [22] A similar view is found in Von Hartmann, who in *Philosophy of the Unconscious* wrote:

> . . . it is never creatively productive, never inventive. Here man is entirely dependent on the Unconscious, . . . and if he loses the faculty of hearing the inspirations of the Unconscious, he loses the

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[20] T. Sharper Knowlson (Thomas Shernol), *Originality, A Popular Study of the Creative Mind*, Philadelphia, J. B. Lippincott Co., 1918, pp. 138–146.

[21] Leo Gurko, *Heroes, Highbrows and the Popular Mind*, New York, Bobbs-Merrill Company, Inc., 1953, p. 209.

[22] Henri Bergson, *Creative Evolution* (translated by Arthur Mitchell), New York, Henry Holt Co., 1911, p. 165.

> spring of his life, without which he would drag on his existence monotonously in the dry schematism of the general and particular. The Unconscious is, therefore, *indispensable* for him, and woe to the age which violently suppresses its voice, because in one-sided overestimate of the conscious-rational it will only give heed to the latter. Then it falls irrecoverably into a vapid, shallow rationalism, which struts about in childish senescent knowingness, without being able to do anything positive for its posterity.[23]

The creative act always bears the stamp of its creator. The more unique the work is, the more distinctly it is marked by the worker. Any view must recognize that creative achievement is influenced by the artist's personality and indebted to the less conscious elements of thought. Clearly, emotions shape what enters the intellect and motivate what emanates from the intellect. Artistic and inventive achievement must frequently involve conjunction between depth content and logical ideas but the moderate view does not equate creativity with sublimation. More radical writers insist that genius finds expression only when the subconscious overthrows the tyranny of logic or when the subconscious in disguise bypasses logic. They assume that creativity comes from the uneducated part of man and moves from the inside out. They agree with Arthur C. Jacobsen and Jeanette Marks who conclude that release is necessary to genius and is commonly accomplished through abnormality, physical toxins, or alcohol. Like Plato, they assume that delirium may contribute to creativity. They contend that dreams, euphoria, and trance provide the illusion of a larger reality and are the source of truly imaginative work. To those who hold such a view educational effort must appear entirely futile. If the unconscious is not only primary but almost totally controlling in works of inspiration and genius then there is little that the school can do to prepare children for these unusual lives.

From this position it is a small step to the belief that genius is promoted by pathology or is itself a pathological condition. Poe, who exemplified many aberrant qualities, including addiction, wrote in *Eleanora:*

[23] Eduard von Hartmann, *Philosophy of the Unconscious; Speculative Results according to the Inductive Method of Physical Science* (translated by William Chatterton Coupland), London, Routledge and Kegan Paul Ltd., Broadway House, 1931, Part II, Chapter XI, p. 42.

> I am come of a race noted for vigor of fancy and ardor of passion. Men have called me mad; but the question is not yet settled, whether madness is or is not the loftiest intelligence—whether much that is glorious—whether all that is profound—does not spring from disease of thought—from *moods* of mind exalted at the expense of general intellect.

Nesbitt, in England and Lombroso, in Italy, were advocates of the view that geniuses are deviates and, therefore, abnormal. Lombroso made detailed search for evidences of abnormality in the lives of great men. His catalog of abnormalities was so generous that large numbers from any group would fall within his definition. He found true abnormalities, of course, but the relative prevalence of these cannot be judged because there is no available standard drawn from an equally detailed search in the lives of common men. There persists a belief that genius has an affinity for madness and that one who breaks the confines of reality enjoys an enlarged and uncluttered view. This is well put in the following lines written a century and a half ago.

> All Pictures that's Painted with Sense and with Thought
> Are Painted by Madmen as sure as a Groat;
> For the Greater the Fool is the Pencil more blest,
> And when they are drunk they always paint best.
>
> William Blake (*ca.* 1808)

The negative view emphasizes accomplishments which are reported to have occurred under abnormal conditions and in states bordering on insanity or somnambulism. Lombroso and others have held that unusual achievements were sometimes the result of disease or injury and ordinarily the product of imbalanced intellects, for imbalance makes singleness of purpose and resolution of doubt. The unenviable state of genius is well described in the words of Lombroso.

> Just as giants pay a heavy ransom for their stature in sterility and relative muscular and mental weakness, so the giants of thought expiate their intellectual force in degeneration and psychoses. It is thus that the signs of degeneration are found more frequently in men of genius than even in the insane.[24]

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[24] Lombroso, *op. cit.*, Preface, p. vi.

We still find the belief that genius and good adjustment are incompatible. A recent magazine editorial argues that psychoanalysis may be appropriate to the businessman or the housewife but not to the creative mind.[25] The writer contends that persons who have no machinery for sublimating their psychological pains may need to have these pains removed but the creative person embodies his frustration in something of artistic value. In all of these views the motivations for creativity are those of escape from psychological pain. Such negative biases lead to an overvaluing of mediocre efforts made by bizarre, immoderate, uninhibited, and addicted artists. These biases lead parents to expect perversion or abnormality in their gifted children. Such expectations lead to overprotection of some and fearful indulgence of others.

Evidence from longitudinal studies of children

Though Mr. Anderson may learn much from his armchair study of genius, he should also examine the follow-up studies of gifted children. If the foreshadowing of greatness is dependent on intelligence, the group selected for the Stanford studies should produce prolific and unusual work and some of these should reach levels of superior merit or even of genius.

The follow-up studies carried on for more than twenty-five years provide a body of evidence supporting this expectation. These children maintained in adulthood approximately the same relative intellectual superiority as that which had been discovered in childhood. By 1950, the eight hundred males in the group had published forty-six books in science, arts, and the humanities; twenty-one in fiction; more than fourteen hundred scientific, technical, and professional articles; over two hundred short stories, novelettes, and plays; two hundred and thirty-six miscellaneous articles; thousands of radio and television scripts, news stories, columns, and editorials. They earned seventy-eight academic and forty-eight medical doctorates along with numerous other degrees, secured more than one hundred and fifty patents, and provided forty-seven names in the 1949 edition of *American Men in Science*.

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[25] Roger Burlingame, "The Analyst's Couch and the Creative Mind" (The Easy Chair), *Harpers Magazine*, 218, No. 1308, May 1959, pp. 14–20.

In these endeavors they produced ten to thirty times as frequently as average men. Vocationally they were in professional occupations eight times as frequently as other men. Those who were most intellectually superior in the group surpassed the remaining gifted subjects in college, grades, extracurricular participation, adult occupational status, and productivity.

These extensive successes need not be interpreted as genius. It is probably impossible to judge this matter adequately in short perspective and before the evidence is in. It is equally impossible to ignore the fact that eight hundred gifted subjects have been amazingly productive and successful in their first forty years. Terman wrote:

> Granting that both interest patterns and special aptitudes play important roles in the making of a gifted scientist, mathematician, mechanic, artist, poet, or musical composer, I am convinced that to achieve greatly in almost any field, the special talents have to be backed up by a lot of Spearman's *g*, by which is meant the kind of general intelligence that requires ability to form many sharply defined concepts, to manipulate them, and to perceive subtle relationships between them; in other words, the ability to engage in abstract thinking.[26]

The Stanford data support the conclusion that intelligence underlies genius. These studies did not, however, ignore the importance of personality, experience, and interest. On the contrary, they are the best available evidence to prove that adult achievements reflect childhood proclivities and interests. The data include pervasive proof that personality is involved in the production of genius. The A group, those who used their abilities most successfully, were also more intelligent, more adequately adjusted, more catholic in their interests, more attentive, more attractive, more alert, more poised, more curious, more original, more active hobbyists, and more friendly than other members of the gifted group. They were characterized by *perseverance*, *self-confidence*, and *well organized purpose* or integration of goals. These are the same traits found by Cox in the leading hundred geniuses in the historical group and in turn they closely approximate

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[26] Lewis M. Terman, "The Discovery and Encouragement of Exceptional Talent," *The American Psychologist*, 9, No. 6, June 1954, p. 224.

Galton's conclusions. The significance of these three traits is heightened by the fact that they are the ones in which Terman's A group most significantly differed from the less successful or C group.

The traits characteristic of the A group in the Stanford studies and of historical genius give some reason to hypothesize a personality of genius. That personality is, however, not as Pascal, Lombroso, and a host of others contend, abnormal. Terman's studies found the A group superior to the rest of the sample and the whole group superior to men in general on social and marital adjustment. They conclude:

> Everything considered, there is nothing in which the A and C groups present a greater contrast than in drive to achieve and in all-round social adjustment. Contrary to the theory of Lange-Eichbaum that great achievement is usually associated with emotional tensions which border on the abnormal, in our gifted group success is associated with stability rather than instability, with absence rather than with presence of disturbing conflicts—in short, with well-balanced temperament and with freedom from excessive frustration. The Lange-Eichbaum theory may explain a Hitler, but hardly a Churchill; a Goebbels, perhaps, but hardly a Goethe.[27]

Conclusions drawn from scientific studies describe genius in a manner that is not unlike Bernard Shaw's statement in the preface to *Saint Joan:*

> A genius is a person who, seeing farther and probing deeper than other people, has a different set of ethical valuations from theirs, and has energy enough to give effect to this extra vision and its valuations in whatever manner best suits his or her specific talents.[28]

There are no other long-range studies comparable to the Stanford ones. We may, however, gather considerable evidence from less organized observations. A 1952 questionnaire study of 41 persons, who were graduates of the "Quiz Kids" program, shows the wide range of interests and hobbies, the educational and early professional accomplishment, and the good health that might be expected from a group with IQs above 135.[29] Intellectual ability is found with the good health, attractiveness, and other qualities which play a part in achievement and fame.

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[27] Lewis M. Terman *et al., The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group, Genetic Studies of Genius,* Vol. IV, Stanford, California, Stanford University Press, 1947, p. 352.

[28] Bernard Shaw, *Saint Joan: A Chronicle Play in Six Scenes and an Epilogue,* New York, Dodd, Mead and Company, 1924, 1930, Preface p. xii.

Sex differences

Long encyclopedia entries are almost all for men. In one encyclopedia the first woman is in seventy-fifth place. That woman was Joan of Arc and she was famous for manly rather than womanly accomplishments. Observation of this nature led Kretschmer to say, "The great women achieved greatness because they were great men." [30] This male monopoly is at some variance with experimental evidence which does not indicate such appreciable sex differences in matters of intellectual capacity. Male predominance is most commonly and, perhaps, most satisfactorily explained by the fact that social customs have placed men in preferred positions to achieve prominence. Our principal, Mr. Anderson, is interested in this point for he knows that in schools, it is the gifted girls who are most readily discovered and the gifted boys who are most often ignored.

The relative effects of masculinity and femininity in genius has long been debated. Marks and others held that female characteristics are essentially recessive and, therefore, not dominant in the production of genius.[31] Kretschmer and others have held that genius does not come from masculinity but from the union of unlike elements which he called "bastardization." Hirsch, a disciple of this view, has deplored that civilization was succumbing because of the "exhaustion of their most vital element, superior blood." [32] He was grievously saddened because there was no new horde of vital barbarians to overrun and regenerate civilized man. In immigration from southern Europe and in the birthrate among immigrant Americans he saw the forerunners of decay and maintained that the human harvest was already deteriorating in America's cities.

Hirsch maintains that there are two types of genius, the artistic and the scientific.[33] The artistic endeavor requires intuition first and then critical and intellectual work. The scientific genius requires intellectual work prior to the radiant illumination of a unified system. Hirsch attributes this distinction to genetic differences. He holds that each genius inherits intelligence of high order through the marriage of unequals, but the artistic genius is dominated by instinct and the unconscious through the influence of the mother; and the scientific genius is marked by objective intelligence through the dominance of the father.

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[29] Paul A. Witty, "A Study of the Graduates of the 'Quiz Kids' Program," *Educational Administration and Supervision*, 38, No. 5, May 1952, pp. 257–271.

[30] Kretschmer, *op. cit.*, p. 126.

[31] Marks, *op. cit.*, p. 166.

[32] Hirsch, *op. cit.*, p. 53.

[33] Hirsch, *op. cit.*, p. 301.

The genetic explanations have enjoyed little popular support but the idea that there are sexual differences has been very common. Kretschmer believed that genius was closely related to an energy curve and he believed, further, that the period of "sexual bloom" was short in women.[34] It follows that he expected few geniuses would be among them.

Rather commonly, writers have held that female thought tends to be in more personal terms, more intuitive and less likely to reach high levels of abstraction and objectivity. At Rutgers University where separated classes are offered for both men and women, a professor examined this question.[35] He concluded that there were basic differences and that the teacher's presentation should differ according to the sex of the class. He concluded that men were the strategists; were system-minded, theoretical, dreamers, and doctrine makers; were more relaxed, secure, and more likely to seek challenge. He concluded that women were the tacticians; were person-oriented, interested in the here and now, realists involved in practice; were more conventional, insecure, and concerned about permanence. If true differences exist, our knowledge of them is piecemeal and inadequate. This issue serves to point up a general problem. Any narrow concept of intelligence must exclude some significant abilities which could contribute to both social welfare and individual happiness. If narrow definition of intelligence inhibits the contributions of women, then it may also be narrow enough to inhibit contributions from other groups. In the long run only a generous interpretation of intelligence or creativity can be socially sound.

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[34] Kretschmer, *op. cit.*, pp. 124–129.

[35] Van Cleve Morris, "Male, Female and the Higher Learning: The Educational Significance of Differences Between the Sexes," *The Journal of Higher Education*, 30, No. 2, February 1959, pp. 67–72.

The nurturing environment: social and cultural factors

The development of genius seems to depend on good schools, cultural stimulation, economic success, and social tolerance for unique behavior. The illustrious Greeks from 500 to 300 B.C. can scarcely be explained without reference to their times. Attica produced fourteen enduring names in one hundred years and at least twenty-five in two hundred years. These names include: leaders—Pericles, Aristides, and Miltiades; philosophers—Socrates, Plato, Theophrastus, and Aristotle; writers—Euripides, Sophocles, and Aristophanes; orators—Demosthenes, Aeschines, and Lysias; historians—Thucydides and Xenophon; and artists—Ictinus, Phidias, and Praxiteles.

Evidence on the effect of favorable environment is not all obscured in twenty-three hundred years of history. Cattell tabulated birthplaces for American men of science for the years 1903 and 1932. In 1903, the place of birth for 123 scientists was Massachusetts, in 1932, Massachusetts was the birthplace for only 72. This drop in proportionate representation was characteristic of Connecticut, New York, and Pennsylvania where the educational facilities had been long established. A rise was recorded for younger states. The proportion from Illinois more than doubled; from Minnesota it increased eight times; from Nebraska, ten times; from Missouri, three times; and from Kansas, four and one-half times. These were more than the result of population changes. As schools were improved and universities were expanded in the Midwest the source of scientific talent shifted sharply westward.[36]

Studies of genius raise the question of opportunity and especially opportunity for contemplation. Cattell's studies of eminent scientists living in America between 1900 and 1915 show that fathers in professional occupations produced fourteen times as many scientific men as other parents, that farm communities produced few and most of these were of lesser quality, and that laborers' children almost never became eminent scientists.

Similar conditions prevailed in England where Galton found chances of eminence in mental work to be four hundred times greater among children of upper-class parents than for those of laborer parents. Both studies were supported by Ellis' study of British genius and by the French studies conducted by DeCandolle and Odin. Though Galton believed that those who achieve eminence and those who are naturally capable are largely identical, he wrote that a wife and family were a considerable handicap. He proposed that petty cares, periodic infantine epidemics and other family interruptions limited the degree of eminence.[37] All these studies conclude that degree of opportunity is an important determiner of eminence.

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[36] Anne Anastasi, *Differential Psychology,* New York, The Macmillan Co., 1937, p. 367.

The preponderance of intellectual eminence among the upper social classes is ordinarily explained in some combination of native superiority, superior enrichment, and more readily attained recognition. Some writers have further proposed that the success is in no small part due to the opportunity to contemplate or to think. Knowlson, particularly, deplores haste in modern life because it is not conducive to discovery.[38] He holds that there is a need for leisure prior to mental exhaustion, that creativity arises from a period of inquiry and a period of rest. This, he argues, is only possible in an atmosphere of leisure and money. Teachers commonly point out that pioneer peoples are unproductive in literature and the arts. Their struggle for survival is keen enough to sop out all of their time and all of their energy. They have neither time nor opportunity to widen the range of knowledge and neither time nor energy to contemplate new or unusual ideas.

Environments which are short of books and materials are the same environments which deny time for thought and contemplation. A geographer has commented that:

> Mountain regions discourage the budding of genius because they are areas of isolation, confinement, remote from the great currents of men and ideas that move along river valleys. They are regions of much labor and little leisure, of poverty today and anxiety for the morrow, of toil-cramped hands and toil-dulled brains. In the fertile alluvial plains are wealth, leisure, contact with many minds, large urban centers where commodities and ideas are exchanged.[39]

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[37] Francis Galton, *Hereditary Genius, An Inquiry into its Laws and Consesequences*, London, Macmillan and Company Ltd., 1925, pp. 319–320.

[38] Knowlson, *op. cit.*, pp. 97–101.

[39] Ellen Churchill Semple, *The Influence of Geographic Environment on the Basis of Ratzel's System of Anthropogeography*, Boston, Houghton Mifflin Company, 1909, p. 20.

The study of exceptional creativity and ability also reveals the importance of prevailing values in the determination of which abilities or gifts shall be selected for development—which shall be punished and which rewarded. It is elementary that some ages have encouraged and recognized philosophers; others encouraged priests, architects, and religious painters; others, revolutionaries and political philosophers. Our own is marked by the prestige of business and natural sciences.

The National Manpower Council and others have educated the public to keen awareness of demands and opportunities in scientific pursuits. In the first year of the National Science Talent Search (Westinghouse-sponsored), 2,460 boys and 715 girls competed.[40] Conversation with high school and college students demonstrates how deeply they are convinced that natural sciences demand the greatest superiority in intelligence. Surrounded by enthusiasm it should be expected that gifted children would develop interest where the rewards and the recognition are so great. Indeed, this is the case. There is evidence that science departments in colleges and universities attract proportionately larger numbers of students with the highest levels of intelligence.[41] They frequently secure superior equipment and accommodations and these in turn make the department more attractive.

The full development of genius requires more than schooling, leisure, security, and the possibility of reward. Especially in the artistic and philosophic fields, there is a need for social conditions which are at once stimulating and permissive. Gardner Murphy has recently examined creativity in an imaginative and thoughtful book.[42] In keeping with his life work he gives full emphasis to subconscious and motivational factors in the creative act. The artistic person does not separate the outer and the inner world but makes conjunction between them. Nevertheless, the creative act is rooted in experience and Murphy is impressed with the evidence that great works appear in eras or waves. These eras are marked by leisure and capital but most of all by the excitement of a great idea. These eras are less notable for conquest or personal adornment than for the vitality of the idea. Frequently the new organization or new view of life is the product of a long period of acculturation but the creativity centers in the finalizing era when the need to unify or comprehend follows learning.

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[40] Harold A. Edgerton and Steuart H. Britt, "Sex Differences in the Science Talent Test," *Science*, 100, No. 2592, September 1, 1944, pp. 192–193.

[41] Dael L. Wolfle and Toby Oxtoby, "Distribution of Ability of Students Specializing in Different Fields," *Science*, 116, No. 3013, September 26, 1952, pp. 311–314.

[42] Gardner Murphy, *Human Potentialities*, New York, Basic Books, 1958.

Gardner Murphy emphasizes the role of culture in the development of both the individual and the group. He thinks the modern search for security in a corporate system leads to company-mindedness and to a standardization of ideas and entertainment. Rigidity comes from social pressures or from beliefs which do not allow new thought or unique organizations. Where outcomes are rigidly prescribed or where individuality is punished, creativity declines.

Generally, art and science have flourished together. Each new idea goes beyond the range of previous experience. Persons who create these new universes deal with complexity and disorder. They search out the unknown, including their own feelings, in order to find greater meaning and coherence.[43] They are marked by psychic energy and their works may seem rash and disorderly because the observer is unable to follow the operations involved. In a non-accepting society this behavior is inhibited and in many cases finds expression only when anger, alcohol, or psychosis free the individual from concern over his acceptance. The methods of release or personal idiosyncrasies are then invested with the sacredness of cause or at least so vividly related to the work that causes are ignored. This emphasis on peculiarity and unnatural motives hides the fact that creativity is greater in less conformist, less success-oriented cultures where the penalty for failure is small.

Talent

Hollingworth, more than any other scientist, has studied the gifted child as an individual. She concludes that selecting children of IQ above 160 automatically means selecting a large portion of "tall, healthy, fine-looking, honest, and courageous" children who will

[43] Frank Barron, "The Psychology of Imagination," *Scientific American*, 199, No. 3, September 1958, pp. 151–166.

have "great love of adventure and beauty" in their makeup.[44] She found these children not only to have superior judgment but to have vitality, force, warmth, courage, audacity, and stability.

The word "talent" carries some of the awe which surrounds any human quality that greatly differs from the norm but it is usually applied to remarkable ability falling short of the superlative. It is furthermore applied to pre-eminence in a certain line, ordinarily one of the arts or skilled pursuits. "Gifted" is ordinarily reserved for intellectual superiority and "genius" for superlative and recognized achievement.

The relation between talent and giftedness is a matter of dispute. Some hold that talents are special abilities while others contend that talents are functions of general intelligence channeled into specific areas. The latter argue that given adequate intelligence and excellent senses, the determiners of talent are motivational ones resulting from experience, interest, and the values attached to that particular ability. Scheifele thinks that there is agreement "that outstanding creative achievement in a special area is accompanied by high general intelligence."[45] The preponderance of agreement seems doubtful since many people think of talent as a specialized and isolated ability. Agreement, if it does exist, would be justified. Terman has shown that great composers and artists were intellectually gifted and that the young musicians and artists in his studies were highly intelligent.

One of the simplest evidences of relationship between intelligence and talent is to be found in intelligence-testing technique itself. One item in the Stanford-Binet Intelligence Test requires the subject to judge which is the prettier of two faces. This item intercorrelates with other items and with total IQ scores. The Goodenough Draw-A-Man technique has been successfully used in estimating intelligence for more than thirty years.[46] It seems beyond doubt that intelligence is basic to many, or in all likelihood, to every talent.

A study of gifted children in the Hunter College Elementary School found positive correlations between intelligence and scores on the Maier Art Judgment Test, the Ruch-Popenoe General Science Test, the Stenquist Mechanical Ability Test, the Detroit Mechanical Aptitude Test, and the Kwalwasser-Ruch Test of Musical Aptitude.[47] While the correlation coefficients are not impressively large, they must be interpreted as significantly important since Wilson was dealing with an extreme group in intelligence and it was, therefore, statistically impossible to expect large coefficients.

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[44] Leta S. Hollingworth, *Children Above 180 I.Q.*, Yonkers-on-Hudson, World Book Co., 1942, p. 285.

[45] Marion Scheifele, *The Gifted Child in the Regular Classroom*, New York, Bureau of Publications, Teacher's College, Columbia University, 1953, p. 11.

[46] Florence L. Goodenough, *The Measurement of Intelligence by Drawings*, New York, World Book Co., 1926.

A study by Charles Lehman approached this question from a different position. He studied public school children in two groups as they were divided by the Kwalwasser-Dykema Music Test. He found a positive relationship between musical level and wrist-finger mobility, reaction time, pulse rate, hearing, vision, and intelligence.[48] Terman and others have concluded that gifted children do superior work in any task but are less distinctively different in manual dexterity or in special talent.

It is unreasonable to ignore in-person variabilities and unevennesses. Some very able persons may be obviously short of musical, artistic, or other specific competencies.

If environmental and educational factors account for talent among the gifted, then the discovery of significant influences should be invaluable. On the other hand, there is a popular belief that these variabilities of talent run in families and are inherited.

A study by Seashore shows the persistence of the musical or nonmusical quality in 531 families.[49] This study demonstrates an increased probability of musical offspring as the incidence of musical ability increases in the family. This does not prove the talent is inherited for it is impossible to discount the value of interest, zeal, and effort in the increase of musical skill. Particularly, it is impossible to imagine that those factors are not greatly influenced by experiences which are common in homes where parents are judged to be "musical stock."

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[47] Frank T. Wilson, "Some Special Ability Test Scores of Gifted Children," *Journal of Genetic Psychology*, 82, 1st Half, March 1953, pp. 59–68.

[48] Charles F. Lehman, "A Study of Musically Superior and Inferior Subjects as Selected by the Kwalwasser-Dykema Music Tests," *Journal of Educational Research*, 45, No. 7, March 1952, pp. 517–522.

[49] Carl E. Seashore, "University of Iowa Studies in Psychology," *Psychological Monographs*, 31, No. 140, 1922.

The casual argument that talent is a special ability is usually begun with illustrations from music. This is an unfortunate choice because, in this field, excellent performance all but defies measurement, because maturation and readiness in music are early when the environment has few of the standardizations common to the school years, and because musical success is so sharply limited by inhibition and by personal insecurity.[50] Consequently, it is extremely difficult to measure the degree of success or to establish the cause for this success.

Lange-Eichbaum distinguishes sharply between genius and talent with the latter being an unalterable, organic constitutional quality. He does not propose that each talent is dependent on intelligence. On the contrary, he proposes that a "talent of form" may be possessed even by the feeble minded.[51] Data-supported views tend to disagree with his position. They hold that intelligence is prerequisite to talent.

Studies, including the Stanford ones, report a gradual specialization in abilities; they discover, too, a childhood foreshadowing of these special accomplishments. As a child Newton played with machines; Byron loved solitude; Darwin made collections; Edison mixed chemicals; Pascal, denied the right to study mathematics, secretly constructed a geometry of his own; and Macaulay wrote a six-year-old's *Compendium of Universal History*. The same foreshadowing was found among the gifted Californians in 1922. It was true for a variety of specializations. Terman found a centering of interest and concentration of effort that distinctly differentiated the future physical scientist from the future social scientist. Scientific thought is not usually considered a talent but it appears as distinctly early as do the specializations which are more ordinarily called talents. The influence of heredity and the unalterable aspects of talent have been overestimated. Likewise, it would seem that the specificity of talent has been overemphasized.

Abilities cohere. If we know only that a person excels in *A*, the best possible guess is that he will excel also in *B*. If his education and nurturance have particularly motivated him to learn *B* and have provided excellent opportunity we may wisely guess that his superiority in *B* will be more extensive than that in *A*. Gifted children have capacity to learn many interests, many specializations—or for those who prefer, many talents. Sound education, in their case, must concern itself with motivations and opportunities over a wide range of activities.

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[50] R. W. Brown, "The Relation Between Age (Chronological and Mental) and Rate of Piano Learning," *Journal of Applied Psychology*, 20, No. 4, August 1936, pp. 511–516.

[51] Lange-Eichbaum, *op. cit.*, p. 73.

Relationship of Genius and Talent with Giftedness

The genius appears to differ so greatly from mankind at large that there has been a temptation to think of him as another species. As such, he has been admired, feared, and resented. He has alternately been explained as deity or devil, evil or good genius, deliberate compensator or subconscious immoderate; but the indications are that no clear separation can be made between "genius" and "gifted." It seems that what is true of one is, to a degree, true of the other. Gifted children may reasonably be expected to be talented in specialized ways and some will reach the level of recognized genius.

The degree of intellectual requirement necessary for the kind of achievement discussed here is frequently overestimated and set well beyond the minimum levels found in the Cox studies of outstanding examples of genius. A modern society with extensive dependence on intellectual work must recognize that adequately educated persons with IQs of 115 and 120 can make major contributions in most fields. Unwillingness to consider 120 as a criterion score for giftedness would probably exclude an Oliver Goldsmith or a Captain Cook and, perhaps, an Andrew Jackson.[52] In light of what little is known concerning how to deal differentially with the gifted and very gifted and in light of the great social need for trained intelligence, it would seem presumptuous for most schools to set a criterion score much above IQ 120.

A 1950 statement for the Educational Policies Commission maintains that genius and talent differ only in degree, with talent being the more extreme deviation on a continuous scale. When Mr. Anderson seeks to determine a reasonable level for admission to special opportunities for the gifted he may find a guide in part of that 1950 statement.

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[52] Cox et al., *op. cit.*, pp. 237–272.

> . . . the principles that should govern the education of the gifted apply in varying degrees to the varying degrees of giftedness and no arbitrary dividing lines need to be established to separate the "highly gifted" from the "moderately gifted" or the "gifted" from the "non-gifted." In practice, however, rough groupings into categories are necessary for purposes of analysis, administration, and instruction.[53]

A practical division between gifted and not gifted

When practical divisions between gifted and non-gifted must be made the considerations involved are both socio-practical and technical. They might include adaptations to—

1. The level which will separate a class of practical size if separate treatment is planned.
2. The test used; because tests have different tasks and different loadings and because they are standardized on different populations, it is not expected that the IQ score will remain identical regardless of the testing instrument used.
3. The percentage of population that might profit vocationally from academic, college-preparatory, and professionally-oriented high schools for gifted children. A survey of three hundred colleges shows that the median IQ ranged from 94 in the least selective to 123 in the most selective.[54]
4. The level suited to a community; in some communities there may be five or six times as many children with IQs over 140 as would be found in another community.[55]
5. The available enrichment opportunities may in some cases be best adapted to IQs over 135. In other communities the opportunities may be suited to IQs of 120.

There can be no appropriate single standard. Starting from a normal or expected distribution it is possible to select a score which will be approximately correct for the specific community. Setting a critical score does not alter the value of selection through clinical judgment which combines many measures and many observations.

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[53] Educational Policies Commission, *Education of the Gifted,* Washington, D.C., National Education Association, 1950, p. 43.

[54] Arthur Traxler, "What is a Satisfactory I.Q. for Admission to College?" *School and Society,* 51, No. 1319, April 6, 1940, pp. 462–464.

[55] Educational Policies Commission, *op. cit.,* p. 44.

A positive interpretation

Works of genius are human works deeply rooted in sense experience. The creative act does not flow out of some clairvoyant process although it is influenced by the aggregate personality and is probably influenced by the subconscious as well as the conscious. In some cases abnormal attitudes or alcohol release the person to perform the works of genius. No triggering mechanisms of this kind are needed by mature personalities functioning in an appreciative society. They are challenged by complexity and inconsistency and they dare to combine the known and the imagined.

Assuredly discontent may focus behavior, neuroticism may increase the need to achieve, immoderate drives may produce morbid fascination, excessive fantasy may produce peculiar works, and psychotic needs may result in tragic and sinister qualities. Each of these has a magnetism of its own and thereby collects its congregation of admirers adding to the fame and reputation of the genius. It is fair enough to propose that immoderate, sinister, and neurotic lives attract more than proportionate attention to the work of an individual and may at the same time influence the quality of his production. It does not follow that these characteristics are prerequisite or common to genius.

Orderly lives are short on interest and salability if compared with the drunken existence of Robert Burns or the opium-colored lives of DeQuincy and Coleridge. In many cases, some part of fame must be attributed to the nefariousness of the author's life. However geniuses as a group are marked by personal intensity, zealousness, and persistence. Like gifted children they have a clear goal and they prevail in the face of difficulty and so are reputed to have an impulsive inner gleam.

Dedication to long-range and individualistic goals tends to isolate and even alienate the genius from men in general. When these goals are ardently and self-confidently pursued the alienation may result in conflict. Nevertheless, the genius is motivated by his guess at greater meaning, tantalized by the inadequacy of his present view, and driven to postulate and test new principles.

Either daring or a sense of freedom is essential to creativity. The innovator must take hold of a new concept or new view. To do this, he abandons the old. This break to a new conceptual hold is always frightening. It appears that geniuses have been not just bright or gifted, though they have been that; they have been both insightful and zealous. They have been steadfast in their responsibility to an idea.

Gifted subjects have many qualities common in genius but only a small number will ever express their intelligence with the force and originality which characterize genius. A larger number but far short of the total may be expected to show talent. Some will reach neither goal; they will be well informed but preoccupied with fact more than with relationships or associations. Others will be isolated from originality by their inability to make an inlet to their own deeper feelings or an outlet for these feelings to find a place in their work. Still others will be deprived by inadequate education or by too great dedication to commercial and immediately practical ends.

It is probable that a society can foster the growth of both talent and genius. It is doubtful that this fostering can be undertaken in any but a general way. If there is inspiration, it springs only from prepared minds. Creativity is limited to those who are well informed and to those who have had experience in associating ideas, dreaming, and imagining. These processes are inhibited in overcautious, conforming, bustling, and personally remote groups.[56] Two questions seem appropriate for schools. Should a program for the gifted be "busy" and closely defined reducing browzing, daydreaming, and lethargy? Should the able and successful college student carry an off-campus job and also read freshman themes for his major professor? The best answers seem to be negative.

Just as there are no tidy methods for the promotion of genius there are no early tests or observations which identify distinctive types of talent or possible areas for the development of genius.[57] The child with ability for unusual work in one field has ability in other fields unless there are serious gaps in his preparation. Parents and educators must defer early selection of specialization or early and narrow preparation for these goals.

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[56] Walter J. Friess, "A Case History on Creativity in Industry," *Creativity, An Examination of the Creative Process* (ed. Paul Smith), A Report on the Third Communications Conference of the Art Directors Club of New York, New York, Communication Arts Books, Hastings House, Publishers, 1959, pp. 179–192.

[57] Roger W. Russell and Lee J. Cronbach, "Psychology, Education and the National Welfare," *The American Psychologist*, 13, No. 5, May 1958, pp. 199–216.

Poets, artists, philosophers, and scientists have been fascinated by the unknown. They have discovered hidden relationships or guessed at meanings from remote analogies. They have perceived universals and expressed them in symbolic or enduring style. The creative process seems remarkably similar from field to field. It seems also that certain qualities of mind and character are essential to genius. At least some of these can be fostered in education suited to the gifted.

6

The Nature of Giftedness and Its Processes

It is useful to come to some conclusions about giftedness itself. Chapters 3 and 4 on identification deal with specific or empirical behaviors and with categorization of these. The review of genius in Chapter 5 also deals with performance. It is now practical to draw on these observations in order to reach a more organized understanding of intellectual giftedness or brightness. Such an understanding is essential in the selection of teaching methods, instructional materials, and school organization appropriate to the gifted.

The unity of intelligence

Is intelligence some single overriding characteristic, some combination of several capacities in hierarchal order or some collection of discrete capacities? This is a vital question in planning education for the gifted. Does Stephen, for example, possess a general or over-all superiority or can it be assumed that he will be limited in mechanical, spatial, social, or some other specific intelligence?

Single-score intelligence tests are based on a unifactor theory elaborated by Wilhelm Stern about 1911. The single factor, called *g* for general capacity, presumably pervades all that a person does. It is a kind of problem-solving ability which may be applied to any problem. Differential performance is then explained in terms of physical adaptability, experience, interest, or other determining environmental factors.

The structure of the Stanford-Binet with its heterogeneous set of items and a single score indicates Terman's conviction that a *g* (general) factor exists. His confidence was increased through McNemar's factor analysis of the 1937 revision which revealed *g* loadings in most parts of the test.[1] However, Terman did not close this matter for in 1954 he urged identification in terms of more specific intelligence factors, if that could be scientifically achieved.[2]

There are two other points of view. In 1904, Spearman outlined a two-factor theory. He suggested that growing out of a general factor there were a few specific intelligences. A British group, Thomson, Vernon, and Burt, have largely followed this idea never expanding the *s* (specific) group beyond three or four. The difference between bright and dull is explained in the amount of *g* factor and it would be comparatively unnecessary to measure any but a few of the most important *s*'s.

The multifactor approach is primarily American and like many other developments was advocated by E. L. Thorndike who argued we have no "intelligence" but a very large number of "intelligences." Thorndike hoped to estimate intelligence in terms of what subjects "do do," not "could do." Consequently, he treated intelligence as identical with skill or knowledge and explained the apparent *g* factor in terms of overlap among specific accomplishments.

The best known multiple-factor work is that of the Thurstones, a husband-and-wife team who developed the test of Primary Mental Abilities.[3] Their work at the University of Chicago was designed in a rational statistical approach. Eleven factors were isolated and of these, seven have retained identity. They are number, word fluency, verbal meaning, memory, reasoning, space, and perceptual speed. Interestingly enough, unlike Spearman who worked from *g* to *s* factors, the Thurstones started with single factors and ended up by showing a large body of *g* or overlap. Each subtest was related to a common, though perhaps not a specifically identifiable factor. The level or degree of relationship is shown in Figure 6.

Stephen is high on vocabulary or on tests of fluency and even casual observation provides evidence that he has a high level of verbal mean-

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[1] Quinn McNemar, *The Revision of the Stanford-Binet Scale*, Boston, Houghton Mifflin Company, 1942.

[2] Lewis M. Terman, "The Discovery and Encouragement of Exceptional Talent," *The American Psychologist*, 9, No. 6, June 1954, p. 25.

[3] Thelma Gwinn Thurstone and L. L. Thurstone, *The Chicago Tests of Primary Mental Abilities*, Chicago, Science Research Associates, Inc., 1951.

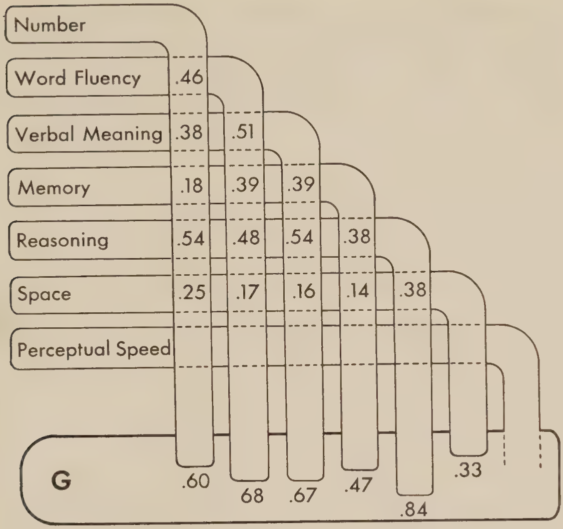

Figure 6.

Thurstone's Multiple-Factor Correlation Coefficients *

* (From *Intelligence: Statistical Conceptions of Its Nature*, by L. J. Bischof. Copyright 1954 by Random House, Inc. Reprinted by permission.)

ing. His perceptual speed and memory are remarkable and his ability to deal with space relationships is demonstrated by the fact that as a sixth-grader he frequently designed hypothetical airplanes using only mathematical methods to determine the most suitable wing slope or wing length for a particular design. He found it unnecessary to draw diagrams or to build models. When asked to do so he could illustrate the design readily and easily.

Stephen further demonstrates unusual capacity for "reasoning." While Stephen was in the fifth grade one of the picture magazines published a series of articles reviewing learning experiments. The series covered studies in which pigeons were taught to peck at a target with a particular design, or symbol, and to ignore a target with some other design. In other experiments rats were taught to jump at doors marked with certain symbols and to refuse doors not so marked. A teacher asked if it did not seem wasteful for people to spend so much time teaching pigeons and rats. Stephen responded with, "Oh, it's not that they want to train the rats or the pigeons. Maybe if they knew how the rat learns clues which lead him to jump or not to jump, they could make up some rules about learning. They could use those rules in order to teach people in schools or in armies or anywhere else."

It must be concluded that Stephen shows a large overlap of abilities. This observation is in agreement with the general data on aptitudes—the Good Fairy has not compensated for each ineptness. On the contrary there is a consistent and positive relationship between aptitudes—intellectual, musical, social, mechanical, or scholastic.[4] In the Hunter College Elementary School, tested abilities of gifted children were found to intercorrelate with others at levels from .39 to .57.[5] Only on musical memory, artistic, and mechanical aptitude tests are there likely to be zero or negaitve correlations with intelligence. The negative correlations found have been too small to be predictive and the extremely short intelligence range in studies of gifted children would be expected to reduce the level of correlation.

Significant overlap among desirable characteristics in gifted children was recently discovered in an important midwestern study.[6] Through tests and rating, sixth-grade children were given percentile scores on "intellectual talent," "social leadership," "artistic talent," "aggressive maladjustment," and "withdrawn maladjustment." Intellectual ability was significantly related to other talents and separated from maladjustments. It was concluded that children who were highly gifted in one of the three talents were quite likely to be talented in the other areas and very unlikely to be maladjusted.

This unity is not found only in young children though it is more observable there. A study of college students undertaken to identify and to describe those who are most democratic demonstrates that the democratic are more successful, are critical thinkers, are superior in English, have better grades, and make higher scores on tests of general aptitudes.[7] A wide range of interrelated good qualities is found and students selected for their intelligence are among the most democratic. Students selected for their respect for others are among the most intelligent and so on. However we should wish it to be, the evidence supports a limited theory of general superiority and general inferiority.

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[4] Philip E. Vernon, *The Structure of Human Abilities,* New York, John Wiley and Sons, Inc., 1950.

[5] Frank T. Wilson, "Some Special Ability Test Scores of Gifted Children," *Journal of Genetic Psychology,* 82, March 1953, pp. 59–68.

[6] Gordon Liddle, "Overlap Among Desirable and Undesirable Characteristics in Gifted Children," *Journal of Educational Psychology,* 49, No. 4, August 1958, pp. 219–223.

Though gifted subjects tend to perform well in every task, a profile of aptitude measures for any individual is very unlikely to be a straight line. Each subject may be expected to do relatively well in some tests and relatively poorly in others. In exceptional cases, one area of performance may be almost incomparably superior to others. This variability in trait relationship is the expected state of affairs, for learning is dynamic and produces differences in performance from one field to the next, As children grow, their interests and experiences cause a development of specialization. The performance of very young subjects tends to demonstrate the *g* (general) factor but later observations more readily show the development of apparently independent skills. Average correlation coefficients between memory, verbal, numerical, spatial aptitudes, and motor speed are approximately .29 for nine-year-olds, .26 for twelve-year-olds and .14 for fifteen-year-olds.[8] The reduction in relationship probably results from increased specialization and consequent inequalities in rates of growth. This shift does not refute the general or the interrelated factor theory. It does indicate the importance of early experience for in childhood gifted people fix interests and determine the nature of their lifelong contributions. It further suggests that single-score tests are most suitable in the elementary and high schools whereas a factor measure of aptitude is appropriate when the contemplated assignment is well defined and thoroughly analyzed as is the case for some armed services selections.

Recent work done by Guilford and his students at the University of Southern California in the Aptitudes Project under a contract from the Office of Naval Research is particularly promising in the possibility of (*a*) defining intellectual components, (*b*) selecting test forms related to each component, and (*c*) organizing the components into a theoretical structure descriptive of intelligence.[9] The Guilford model has three major aspects and may be visualized as a cube. Each dimension of the cube represents one of the aspects or modes of the factors. One dimension represents kinds of operation or process involved. A second represents the kinds of content and the third represents the kinds of product. The operations dimension has five categories: cognition, memory, divergent thinking, convergent thinking, and evaluation. The contents dimension is divided into four: figural, symbolic, semantic, and a theoretical category, behavioral. The products categories are six: units, classes, relations, systems, transformations, and implications.

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[7] Maurice F. Freehill, "The Democratic College Student," *Journal of Educational Psychology*, 46, No. 8, December 1955, pp. 477–487.

[8] E. G. Boring *et al.*, *Foundations of Psychology*, New York, John Wiley and Sons, Inc., 1948, p. 412.

The large cube, or mass of intellect, may be viewed as a collection of smaller cubes with each dimension representing a category. There would be 120 small cubes or component abilities. About fifty of these abilities have been isolated and described, but in some cases the smaller cell or component ability has been found to be itself divisable. If 120 or more abilities are eventually established, a true description of an individual's intellectual resources will require a number of scores. However, many of the factors are intercorrelated and the number would be well under 120.

The Guilford model implies the possibility of more accurate matching of worker and assignment and perhaps the selection of educational experiences designed to develop a specific intellectual component. For example, the "figural" category in the "contents" dimension deals with sense material used as it is perceived. It represents a kind of "concrete" intelligence used by mechanics, machine operators, and to some degree by engineers, artistic painters, and musicians. It can be detected by selected test items and possibly increased by well-chosen activities.

Some of the Guilford components are near-descriptions of highly intellective and creative functions. The component represented by the cell evaluation (operation), implications (products), and symbolic or semantic (contents) would apparently translate into ability to evaluate implications in symbolic or semantic material. This is like ability to sense or recognize problems which is a prerequisite to inventive and creative work. The divergent thinking (ability to produce a variety of responses) and transformation (ability to modify or change) categories are most closely related to recognized creative thought. Originality involves divergent or adaptive flexible response. In semantic material it also involves transforming or shifting meaning or form to arrive at an effective, clever, startling, or consoling presentation.

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[9] J. P. Guilford, "Three Faces of Intellect," *The American Psychologist,* 14, No. 8, August 1959, pp. 469–479.

An intelligence model with multiple abilities is widely accepted although the separate abilities are neither agreed nor well defined. Little is known on the cause of these in-person differences whether they result from heredity, early intellectual organization or developmental experience. Differences in abilities are found at various levels of intelligence and investigations continue to demonstrate overlap. The competencies of gifted persons fluctuate from task to task but the level about which they fluctuate is high. Giftedness involves a confluence of superior capacities.

Intelligence as organized action or behavior

Is intelligence accomplishment or is it capacity? Is it revealed by what one does or by what one is capable of doing? During World War II, the Office of Strategic Services (OSS) found it advisable to invent a concept of "effective intelligence" to describe "effectiveness of the whole system of mental operations." This was an attempt to define intelligence to be nearly coincident with performance in a limited and highly definitive group of required behaviors. The definition was developed specifically as it applied to the informing and sabotage tasks assigned to OSS.[10] Consequently, "intelligence" by this definition was subdivided into *afferent* (collection, analysis, and reporting information) and *efferent* (planning, teaching, and executing of operations). Society often judges intelligence in just such terms of functional effectiveness.

Shifts in functioning level are within a general range for the person but are frequently observable. The West African native who scores poorly on performance boards used in non-verbal intelligence tests becomes superior to the psychologist the moment he enters the bush. His inability to identify geometrically-shaped blocks which fit into a board does not indicate inability to discover movement and shape or to estimate distance in his natural habitat. Can this be explained by experience and frequency, by interest and attention, or by some almost congenital difference between the primitive and the sophisticated?

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[10] U.S. Office of Strategic Services, OSS Assessment Staff, *Assessment of Men* (Selection of Personnel for the Office of Strategic Services), New York, Rinehart and Co., Inc., 1948, pp. 264–281.

No good answer is available. Writers of the romantic period were inclined to suppose that removal from nature and from primitive emotion clouded insight. Subsequently, materialism and scientific psychology developed the idea that functioning intelligence might be attributed to experience and to the development of a mass of specific responses or learnings. Comparatively modern experimentation shows a very great consistency of ability and maintenance of thought patterns from an early age. The consistency of organizational pattern has created some doubt concerning the hypothesis that equally intelligent people provided with similar and equally good experiences will be equally competent in thought.

There is a trend toward the belief that superior capacity requires not only excellent nervous tissues and wide experience but intrinsic or exceedingly early organized activity in the cortex.[11] In effect, some modern theorists hold that persons differ at birth in constitutional ways which have a limiting effect on perceptions such as those of space, but moreover, they differ also in an inherited "deduction and organizing activity of the mind." [12] Piaget, a famous European psychologist, argues that the functional activity of reason is inherent or constitutionally determined because organisms would be entirely unable to adapt to environmental variations if they were not already organized by some principle which is capable of rejecting the contradictory or the incoherent.

The proposal that there are acquired or even inborn patterns for intellectual response is now more graciously received than it would have been a generation ago, for instinct enjoys renewed respectability. It is commonly accepted that a way of "seeing" or the structure of thinking arises early and is markedly consistent. This early organization underlies all of an individual's thinking and every aspect of intellectual growth is an expansion or an elaboration of previously organized thought. Piaget is led to the conclusion that "intelligence elaborates itself." [13]

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[11] D. O. Hebb, *The Organization of Behavior, A Neuropsychological Theory*, New York, John Wiley and Sons, Inc., 1949, pp. 120–123.

[12] J. Piaget, *The Origins of Intelligences in Children* (translated by M. Cook), New York, International Universities Press, Inc., 1952, p. 21.

Available evidence suggests, but does not prove, that high intelligence is patterned or individualized either from the beginning or from a point very early in life. That pattern or organization is shifted, moved, or made more complex but it continues to underlie all thought and invention throughout life. Since the first experience had meaning, the person must have had needs or values which caused him to judge the particular experience as satisfying or unpleasant. The earliness, the stability, and the source of this pattern are unexplored but important aspects of thought.

It would be important to know whether such early organizations explain the differences between Stephen's intelligence and Nancy's intelligence: between the ingenious academic and the tractable imaginative though the two IQs are almost identical.

Thought: the higher mental process

It is difficult to define anything that approximates "higher mental functions." The boundary between feeling and thought or between emotion and reason must always be shadowy and vague. Higher functions are ordinarily defined as those which involve conscious purpose and effective control of the environment. This definition implies the selection of drives, the use of tools and mental organization. Such distinctions limit higher functions to what is often called insightful learning because it involves experiences which are altered by recognizing or by evaluating. Thinking implies selection of means not by chance but through evaluation of their appropriateness in terms of selected ends or goals. This "human" or "higher" mode of learning is differentiated from "animal" or from "lesser" learning by the fact that there is a selection or a modification of natural goals and a logical or appropriate rather than an inherent or instinctive approach to achievement of the goal.[14]

Insight or cognitive functions are ordinarily thought of as higher processes. The adaptions or adjustments in behavior are not predominantly a matter of sense apprehension nor a manipulation of objective things, nor are they determined solely in terms of stimuli present at the moment.[15] Such cognitive behavior, mental exploring, or organizing in which memory plays a major part may be called "thinking" or "thought." Abstract aspects of thought such as generalizing, analyzing, and reasoning are usually distinguished from remembering, feeling, and sensing.

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[13] *Ibid.*, p. 359.

[14] Magda B. Arnold, "A Theory of Human and Animal Learning," in Magda B. Arnold (ed.), *The Human Person; An Approach to an Integral Theory of Personality*, New York, The Ronald Press Company, 1954, pp. 331–370.

No agreed catalog of "higher mental" or thinking processes is available but descriptive terms commonly used include reasoning, creating, problem-solving, concept-forming, deliberating, evaluating, integrating, inventing, and understanding.

The land of never-never: An illustration

The higher processes begin very early. Consider the first stimulation to which a newly-born child is subjected. These stimulations may be mechanical, chemical, electrical, or what you will, or a combination of any of the foregoing. The beating of the bones in the ear has little apparent connection with what we know as music. The image cast on the retina is inverted and greatly reduced in size. The task of the learner is to somehow relate these impressions to an external world of reality.

He begins by evaluating everything in relation to himself. Soon he finds entities outside his own ego and we call this recognition. After acquaintanceship with things which make up his small world he turns to perceiving relationships between and among the acquaintances. He discovers "his family," birds become a "flock," and cows become a "herd." He has developed a generalization and is ready to solve problems on a symbolic level with a "thought model." He can now manipulate part of his environment in a model situation rather than through the physical handling of each object. He no longer must try each key in the lock. Words stabilize his memory and make it possible for him to fit his experience into history and into the broad patterns of generalized knowledge.

Once the symbolic processes have begun they permit the child to proceed to a study of relationships which have not really existed and which may never exist. The learner has entered in the land of Never-Never-Was. Conjecture and speculation and the testing of hypotheses become possible. Here human learning is not readily explained by animal experiments. Granted, animals make some selections among behaviors and are capable of somewhat delayed reaction, but it must be admitted that they are still dealing with situations which have temporal or local reality or have had some such reality in the past.

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[15] W. Edgar Vinacke, *The Psychology of Thinking,* New York, McGraw-Hill Book Company, Inc., 1952, pp. 1–18.

In his world of models, in the land of Never-Never-Was, the human learner often deals with relationships which are promptly referred back to specific objects in the real world, but one sort of human thinking seems to be logically separate. A relation between two objects is itself given existence, reified if you like, in the mind of the learner and then two or more such relationships can be compared and manipulated. As a result conclusions can be drawn which are not tied to physical objects. These comparisons or manipulations lead to the formulation of principles or laws and they are ordinarily the province of people who deal easily in symbols and in higher processes.

A scientist working with water discovers that it has a certain quality, say, of compressibility. Working later with gases and oils he finds them to possess the same quality. Finally, he reaches a conclusion about an overriding quality of compressibility which is directly related to the second-level quality and only indirectly related to the classes of water and gas and oil and only ultimately related to batches of material which were originally handled. These high-level conclusions are so satisfactory that we do not hesitate to apply them to entirely novel subjects and situations which never entered into the preliminary study. Abstract or model conclusions play a vital role in creative learning, in problem solving, in judgmental learning, and in performances which are most truly characteristic of the gifted.

Higher mental processes are characterized by organization. Why this organization is better achieved by more intelligent subjects is an old and knotty problem in psychology. Associationists of various shades and convictions have proposed that the reflex is the basis for all learning and that movement or change in movement is the evidence of learning. These movements or habits are acquired either simply through repetitive association or through a reward-punishment cycle or through reinforcement because that specific behavior has survival value. Some have argued that speech and thought are simply responses that have been learned or selected from random activities because they have proved rewarding.

Complex beings substitute internal responses for overt acts. Under these assumptions thought is little more than unnoticed or imperceptibly small language responses which have been patterned or organized by experience. Invention or original thought results from extensive experience; or it occurs because there are many memory specifics or because there is extensive manipulation of memory elements. This view recognizes differences in capacity to acquire and to recall elements but it endorses experience or habit and repetition as the learning device most appropriate to everyone.

Gestaltic configurational or field theories have influenced most modern explanations of the nature and etiology of thought organization. *Field* or *cognitive* approaches postulate purpose as the organizing force in thought with unity as the major characteristic of thinking and of invention. All mental processes—"conscious," "preconscious," and "unconscious"—are unified and interrelated in order to give meaning or to assure organization which is more appropriate to the achievement of the individual's purpose.

The observer or the learner perceives and remembers the parts of an experience which fit into his conclusion or into his total observation and fails to see the parts which are inconsistent or intolerable. He sees selectively rather than indiscriminately. The learner has a stake or bias in the content to be learned and he accepts or gives attention to elements which can be fitted into his own dynamic organization. Consequently, the stimulus value of experience is partly determined by individual needs and the thought responses, because they must be compatible with the thinker, are individualized.

This view holds that increasing intelligence is marked by increasingly fine ability to reorganize what is known or what is perceived because some unifying principle makes it possible to bring together the separate experiences.[16] It tends to be nativistic and emphasize intellect, valuing the quality of response more than the length of practice. In this perspective problems are solved through perceiving the new relationships rather than trying old responses. Each new organization of field rearranges an earlier and probably less complex field through additional perceptions or through altered perceptions or through the forcing out of perceptions. In this way the new solution is tied to the old and thought is marked by continuity as well as newness or uniqueness.

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[16] Frank J. Kobler, "Contemporary Learning Theory and Human Learning," in Magda B. Arnold (ed.), *The Human Person; An Approach to an Integral Theory of Personality*, New York, The Ronald Press Company, 1954, pp. 314–330.

Originality or newness has been one of the major qualities discovered through factor-analysis of inventive thinking in science and engineering.[17] This ability is manifested in tasks calling for improvising or redefining, in items which require the subject to perform an operation with an unusual tool or to suggest what might happen in unusual or abnormal conditions. These abilities probably involve large elements of divergent thinking, evaluation, and transformation. These terms are from the Guilford studies which were based on scientific creativity but the conclusions are supportd by Viktor Lowenfeld who did similar research in artistic creativity at Pennsylvania State University.[18] Specific abilities such as shifting the function or rearranging seem common to all creativity.

Lowenfeld points out that the creative arrangement is marked by coherence, by a striving for higher forms of organization; not through arbitrary or set patterns but through arrangements which are both economical and appropriate to the individual work. It seems possible to conclude that in the higher mental process or in the truly creative enterprise the subject always seeks the best or most appropriate and economical organization and this very sparseness and appropriateness of activity leaves the two-fold impression of ease in performance and uniqueness in solution.

Sensing and solving problems are recognized functions in the higher mental processes. Both the Guilford and Lowenfeld studies found sensitivity to problems as a major characteristic of creative work. Gifted children with refined perceptions and ability to recognize and remember have ability to sense the nature of problems. Nancy and Kathy or other children with highly-developed social conscience and sensitivity, characteristic of giftedness, may be expected to understand problems which arise in the social studies class or to see the lack of relation between the mathematics problem and the computed answer.

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[17] Robert C. Wilson, J. P. Guilford, P. R. Christensen, and D. J. Lewis, "A Factor-Analytic Study of Creative-Thinking Abilities," *Psychometrika*, 19, No. 4, December 1954, pp. 297–311.

[18] Viktor Lowenfeld, "Current Research on Creativity," *NEA Journal*, 47, No. 8, November 1958, pp. 538–540.

Both recent research and long-term observation indicate that able children have ability to reduce problems to specifics or to isolable parts which will be valuable in the recombinations or solutions which are to follow. Even more important, they are able to synthesize or develop closure in both sensing and solving the problem. It is not disputed that the accumulation of memories and the ability to abstract are important in problem-solving, but uniqueness and brilliance are most revealed in solving or in hypotheses-forming.

Tentative closure or hypotheses formation involves a truly higher process, distinct from rote and requiring greater capacity to use reference models or generalizations. Hebb describes this growth of learning capacity as "a conceptual development" rather than an elaboration of a number of specific motor responses.[19] Such conceptualizing is impossible without adequate neural development and equally impossible without the facilitations of experience through which supporting or prior conceptions are brought into the new organization or thought. Such indirect meeting of need, development of thought models, or conceptualization provides for economic problem-solving and is the earmark of superior intellectual function.

Differences in ability are misunderstood when they are explained only in terms of learning rate, with intellectually superior children learning more and dull children learning less, or when it is held that gifted children merely solve problems more rapidly. There is a tendency to judge learning through careful measurements of increment, especially increment of memorized knowledge. This quantification assures a degree of scientific and statistical security and it emphasizes memory, drill, and rote. While the able individual accumulates information rapidly he also perceives more related issues, discovers more implications and solves problems in more complex or more complete ways. The gifted student may seem to give the same answer as the dull one but it is unlikely that they have solved the same problem or that the response indicates exactly the same solution. The intelligent student sees the problem more completely and has eliminated many incorrect responses which the less able student may try on the next occasion. The good solution may be slower rather than faster.

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[19] Hebb, *op. cit.*, p. 116.

Phylogenetic evidences scarcely support the idea that the more able the being is, the more rapidly he learns. In lower orders of life, whatever learning is possible seems to appear almost at full strength on the first adequate response. A partial explanation of this might be made through the argument that ascent through the phyla involves increasingly long infancy and immaturity periods with increasingly long periods of exploration in each area of development. This is, of course, no complete explanation. Hebb writes:

> There is no evidence to support the idea that learing *in general* is faster in higher species—even at maturity. In the infant, the evidence is conclusive that the rate of the first learning is slowest in the highest species, quite apart from slowness of maturation. The distinctive characteristic of learning in higher species is the ability to handle complex relationships, and handle them as quickly as lower species can handle simpler ones. Man can learn to unfasten a latch quicker than the chimpanzee, the chimpanzee quicker than a rat; but, if we take the learning at which each species is most efficient, there is no good evidence that one is faster than another.[20]

Those who would explain giftedness primarily in terms of rate and quantity should find real disagreement with the following summary from Hebb:

> 1) more complex relationships can be learned by higher species at maturity; 2) simple relationships are learned about as promptly by lower as by higher species; and 3) the first learning is *slower* in higher than in lower species.[21]

Many problems of educational practice would yield to more ready solution if we could discover which kinds of learning are peculiarly the province of gifted children. This question leads to an examination of qualitative differences in learning.

Attention to qualitative differences in learning involves an attempt to explain complex human learning and to distinguish between higher and lower orders of response. The attempts to explain these differences have been made through theories which stress accumulation of experience by (*a*) contiguity and repetition in the fashion traditionally called "conditioning," or (*b*) through insight as a function of the central nervous system, or (*c*) through two factors with some learning attributed to conditioning and other learning to insight. From any view, giftedness involves more than speed. It involves the ability to solve complex problems effectively.

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[20] *Ibid.*, p. 115.
[21] *Ibid.*, p. 116.

Problem solving, thinking, and conceptualizing involve labeling or naming and require fluency. The accumulation of labels is somewhat individualistic and may be partly controlled by subconscious reaction, but if a concept is to be shared it must be possible to make some symbolic representation of it. Language is a socializing tool and has been called the "motor mechanism" of intelligence since "it represents ideas, it controls human action or socializes and it induces an affective state." [22] Animal vocalizing may express feeling, identify a thing, or give a signal but it probably does not convey generalization. Learning to associate names with objects meets minimum standards for communication but is less complex and less effective than talking which involves symbolic reference.

Higher functions depend on symbols which do not resemble the thing symbolized and usually refer to a class or to a generalization rather than to a specific memory. Among the most valuable and economical tools are the symbols of music, language, and mathematics. Effective use of these tools facilitates the growth of intelligence and the manifestations of giftedness.

There is a large body of evidence to support the contention that thought or reasoning does not exist separately from symbolism. It is very unlikely that, under usual circumstances, one may truthfully say, "I understand it well but I cannot express it." Language expresses or disguises feeling, substitutes for other bodily reaction, and influences or controls others. Words give stability to memory, assist in organizing thought, and provide an economical means of extending experience or exploring ideas. Plato likened Socrates to a midwife because he was expert in bringing thought out from the inner world of the mind into recognizable existence. The Danish philologist, Otto Jesperson, writes of the girl who said, "I talk so as to find out what I think, don't you?" In both cases, they recognize that talking or symbolization is the groundwork for thinking. It provides for economy in investigation and for appropriate use of the experience of others.

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[22] Arnold, *op. cit.*, pp. 363–369.

In the beginning the child uses only nouns and the word "dog" may mean "see the dog" or "where is the dog" or "I am afraid of the dog." As the more massive first experiences are refined and specialized, adjectives appear and separate "dog" and "black dog." Adverbs, prepositions, and sentence structure soon facilitate deliberation and planning or thought which requires a minimum of activity and action.[23] Ability to learn would be greatly limited by failure to master words and their meanings. If terms such as "large," "open," "bright," "heavy," and "good" should suddenly lose their meaning we would be severely handicapped in learning. Without words, thinking must indeed be broken, vague, awkward, and ineffectual.

Words are increasingly essential as experience becomes more complex and more significant. Experiments in blindfolded maze-tracing show that students who depend on kinesthetic or feel clues require almost twice as many trials as those who visualize. The visualizers require more than twice as many trials as subjects who verbalize the directions and the size of their movements. Apparently, verbalizers register their experience in the more permanent and more accessible form. Consequently, they are more efficiently able to use experience.

There are consistent data to show that disorders of speech and expression frequently accompany intellectual impairment. It is also clear that speech impairments limit intellectual functions. It is significant that deafness seems to retard intellectual growth more severely than does blindness. Congenital or early occurrence of deafness is particularly damaging. Though some of the apparent differences may be artifacts of the tests or observations, there are real differences. These evidences reinforce the conviction that there is much greater overlap between linguistic ability and intelligence than most people care to admit.[24] The mastery of language is to a very large degree the *sine qua non* of conceptual thinking and one of the best indications of intellectual development. Rejection of the conclusion that an individual is gifted on grounds that the tests used or the observations made were too verbal requires careful re-evaluation. Talk and intelligence are not identical but they are very closely related.

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[23] A. F. Watts, *The Language and Mental Development of Children; An Essay in Educational Psychology*, New York, D. C. Heath and Company, 1948, p. 5.

[24] W. D. Commins and Barry Fagin, *Principles of Educational Psychology*, 2nd ed., New York, The Ronald Press Company, 1954, p. 181.

Symbolism is a tool of conceptualization and the achievement test profiles for excellent performers are ordinarily high on comprehension, vocabulary, and other conceptualizing and symbolic sections. "Hand bright" and "head dull" is Pollyanna fiction more than reality. It is reasonable to expect that great disparities between bright and dull will be found in conceptualizing, symbolic and language skills; and, indeed, it is found to be so.

High level processes involve both ideational fluency and flexibility. Recent research shows that creativity depends on ready association and easy production of new ideas. These qualities facilitate the acquisition of experience and also facilitate uninhibited use of experience in unusual situations or in unique solutions.

These characteristics appear most readily in non-punitive situations where unique responses are not only tolerated but encouraged. It might be conjectured that conditions which reduce the caution needed in contact with the external world release energies and ideas often assumed to be subconscious. Energies and purposes of this nature may partly account for the fact that the creative process is not readily observable. Artistic, imaginative, and dream productions appear to be internalized, subjective, or personalized and may have large dependence on unrecognized or unconscious influence. In the 1880's Francis Galton argued that this confluence between the "presence chamber" and the "antechamber" (just beyond the full ken of consciousness) was valuable and perhaps essential. If creative work does call on ideas which are not readily recognized or only partly conscious then it is almost impossible to separate the conditions which release these forces from the processes themselves.

The creative person is flexible enough to use marginal observations, hunches, and perhaps subconscious perceptions in the effective solution of problems.

The significance of this flexibility may be guessed from observations made by University of Chicago professors who have been studying five hundred children in grades six through twelve.[25] The majority of gifted children are, of course, both high on intelligence scores and in creativity but the investigators succeeded in isolating two groups who must be exceptions to the rule. One group was highly intelligent (in a conventional sense or in terms of IQ) though not equally creative; the other group was higher on creativity than on intelligence. Differences between the groups were striking.

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[25] J. W. Getzels and P. W. Jackson, "The Meaning of Giftedness An Examination of an Expanding Concept," *Phi Delta Kappan,* 40, No. 2, November 1958, pp. 75–77.

The groups were "equally superior" in school achievement but the first or conventional intelligence was associated with drive to success, a search for characteristics which are important in adult life, and an attempt to be the kind of person approved by teachers. This high IQ group valued high marks, energy, character, and goal-directedness.

The second group, higher on creativity and lower on measured IQ, was less favored by teachers and less ready to accept the teacher-approved model. The group was less concerned with success, less impressed with high marks and placed less value on high IQ itself. This group valued sense of humor, emotional stability, and broad interests.

Findings of this sort may suggest that suitable conditions will produce original and imaginative behavior in children with levels of measured intelligence below that which is ordinarily assumed to be gifted. The achievement of this goal may require the development of attitude or approach. The authors report that creative students respond to stimulus pictures in a characteristic fashion. Their stories seem to spring *from* the picture rather than be tied *to* the picture. They do not "labor" to produce the "correct" story; they enjoy the invention and they introduce "humor, novel situations, and unexpected endings."

These observations serve to reinforce the conclusion that gifted students should not be selected on the basis of IQ alone. It should be equally obvious that any single observation other than IQ will also exclude some truly creative persons. In either case, the exclusions occur because the concept of intelligence is narrow and incomplete. Values or goals determine the nature of observation and narrow purposes assure that a large number of able children will never be identified. In order to discover gifted children and to arrange suitable experiences for them after discovery it is necessary to examine and to extend our views on the nature of giftedness.

Some conclusions

The overriding qualities of high intelligence appear as common characteristics in creativity, whatever the field. These qualities or organizations of thought form early in life and control or limit the kind of thinking and learning which are likely to be pursued.

Central or most distinctive among the higher processes is the ability to conceptualize, especially to unify or synthesize experience and facts into unique solutions. Conceptualizing involves language or symbolic behavior, ability to organize, broad experience, and creative flexibility. It seems likely, too, that artistry or creativity is increased through personal sensitivity and the ability to introduce deeper or personal values.

7

The Growth and Development of Intelligence

> To identify the internal and external factors that help or hinder the fruition of exceptional talent, and to measure the extent of their influences, are surely among the major problems of our time.
>
> Lewis M. Terman, Walter V. Bingham
> Lectureship, 1954

Pete, Nancy, Kathy, and Stephen differ from most children at Elm Road School. They react quickly and they react to smaller stimuli. They assimilate learning easily. They are capable of sustained attention, self-criticism, generalization, and invention. Why? Are they structurally different or is this difference to be explained by experience?

Physiological considerations

There is some argument whether learning can become unendingly complex in one being or whether it shortly reaches a physiological ceiling. Most people know of cretinism and dullness related to thyroid deficiency. This is one of the better known or more obvious kinds of limitation. There are numerous other incomplete evidences of structural and physical limits to learning. Only thoughtless people insist that anyone can learn anything if he will but try long enough and hard enough.

Fascinating psychological literature has been written around attempts to educate feral children—supposedly raised by animals. One of the more famous cases is that of Victor, the Wild Boy of Aveyron, captured in a forest in 1799. A French physician, Itard, was much interested in the problems of abnormality and undertook the education of Victor, with the hypothesis that isolation and deprivation explained the boy's limitations. His emotional behavior was erratic. He did not respond in normal ways to sounds or smells. He trotted or galloped and seemed to have little memory. Itard spent five years in a somewhat futile attempt to civilize the child. Certain simple communication and routinized behaviors were learned but nothing like normalcy was achieved. Results in other famous cases such as that of the Nuremberg Boy or the Gazelle Boy support the theory of physical limitation. In fact, there is reason to suppose that some of these children had not been raised by animals but had, on the contrary, been recently abandoned by parents who had failed to teach them humanized behavior.

Another story of considerable interest is that of Gua, the chimpanzee. Gua was raised like a child and with a child, for nine months following the age of seven and one-half months.[1] The rapidly maturing Gua learned well at first but soon reached limits set by heredity. Thereafter, she rapidly lost ground to Donald, her human "brother." The limits apparent in Victor or in Gua are usually explained in terms of physical structure.

Alcmaeon of Crotona (550–500 B.C.) is reputed to have performed dissections which convinced him that brain and consciousness were closely related. The subject of brain function has continued to be an engrossing topic of speculative conversation through the ages. In 1662, the anatomist Stenson deplored the dogmatic guessing which then characterized theories of specific area brain functions and as late as 1940, Carmichael pointed out that this speculation continued without carefully sought evidence.[2]

In these speculations the central nervous system was assigned the crucial role in learning. It seemed reasonable to suppose that complex learning depended on a highly structured nervous system. In the early period of scientific psychology the brain was viewed as the center of a telephone-like signal system. Then, as learning theory became more complex, the brain was not viewed as a specialized and separated thought machine. Learning and thought seemed to arise from more peripheral and total-person relationships. The process was described as one of "gradual encephalization" with behavior beginning as a local muscular reflex and gradually coming under neural, spinal, and cortical control. Some of the conjecture can now be evaluated as the result of medical and psychological studies. The findings come chiefly from electroencephalograph studies of brain waves and studies of learning defects in cases of brain injury.[3]

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[1] W. N. Kellogg, *The Ape and the Child*, New York, McGraw-Hill Book Co., Inc., 1933.

[2] Leonard Carmichael, "The Physiological Correlates of Intelligence," *Intelligence: Its Nature and Nurture, 39th Yearbook of the NSSE, Part I, Comparative and Critical Exposition* (Guy Montrose Whipple, Ed.), Bloomington, Illinois, Public School Publishing Co., 1940, p. 96.

The new evidence supports the earlier hypothesis that learning has a peculiar dependence on the prefrontal cortex. Halstead, as a result of extensive work with brain-damaged patients, has pointed out that the function of intelligence is represented throughout the cerebral cortex but is maximal in the cortex of the frontal lobes. He writes:

> The frontal lobes, long regarded as silent areas, are the portion of the brain essential to biologic intelligence. They are the organs of civilization—the basis of man's despair and of his hope for the future.[4]

Goldstein and Scheerer studied the effect of frontal brain injury in humans and their findings agree with those of Halstead.[5] They concluded that such patients were impaired in ability to deal with abstract concepts. All new learning was difficult but the capacity to generalize or abstract was more seriously impaired than memory or ability to deal with concrete things. It also appears that early injury may prevent development of intellectual capacities whereas equally serious injury later in life will not destroy that capacity. The establishment of some learnings seems to require a larger amount of brain tissue than that which is required for maintenance of the same behavior once learned. Perhaps "short circuiting"—leaving out some of the cortical action or the simplification of a wave pattern—is a possible explanation of this saving. It is the new conceptual learning which seems especially dependent on cortical integrity.

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[3] See Lloyd A. Jeffres (ed.), *Cerebral Mechanisms in Behavior*, The Hixon Symposium, New York, John Wiley and Sons, Inc., 1951, and Ward C. Halstead, *Brain and Intelligence: A Quantitative Study of the Frontal Lobes*, Chicago, University of Chicago Press, 1947. For a more popular treatment see John Edward Pfeiffer, *The Human Brain*, New York, Harper and Brothers Publishers, 1955. For the implications of these studies see D. O. Hebb, *The Organization of Behavior: A Neuropsychological Theory*, New York, John Wiley and Sons, Inc., 1949, and John C. Eccles, "The Psychology of Imagination," *Scientific American*, 199, No. 3, September 1958, pp. 135–146.

[4] Ward C. Halstead, *op. cit.*, p. 149.

[5] K. Goldstein and M. Scheerer, "Abstract and Concrete Behavior: An Experimental Study with Special Mental Tests," *Psychological Monographs*, 53, No. 2 (Whole No. 239), 1941, pp. 1–31.

The human brain is large in terms of brain-body ratio, but size alone does not explain its greater efficiency when compared with other high order animals. The human cerebrum or frontal lobes account for a much larger part of the brain. Loss or damage to these areas interferes less with the behavior of a fish or a dog than with the learning ability of a child. Such damage interferes with complex rather than primitive learnings. Instinctive and simple reactions are a much larger part of the behavior of limited animals and these are less dependent on the size and soundness of the frontal areas than are functions such as reasoning, speech, and thought which are confined to beings of higher intelligence.

In lower orders of life the brain appears as an extension of sensory equipment. It operates when the senses are activated and it responds in a manner that approaches a one-to-one relationship. The rat may be described as stimulus-bound because he reacts in direct, unmodified, unhesitating, and unvaried ways. Generalization and association play a minimum part in determining his responses. On the contrary, man's behavior is selective, delayed or considered and varied. To some degree he chooses to react and he selects among his reactions. The unobservable behavior which occurs between stimulus and response in the human is usually called insight or generalization. This independence from immediate reaction and from undifferentiated response is a major species difference. It is also one of the differences between the dull and the gifted. The ability to wait and to choose responses is characteristic of beings with relatively large amounts of associative area in their brain structure.

The physical assemblage involved in association is unbelievably complex. The cortex contains billions of neurons and thousands of these may be activated in a single second. Each neuron receives stimuli from as many as one hundred dendrites and discharges through as many axioms to other neurons anywhere in the cortex. The number of interconnections is amazing in itself. The ability to integrate the impulses is more amazing. The discharges do not follow a simple order from sense input to reaction. The neurons themselves have vitality and they function in relation to the input and discharge so that a complex set of waves or patterns result. Certain patterns are repeated in part or become preferred. Although the patterns are continuously being modified, the use of any relay or set of synapses seems to enhance the probability of recurrence. It appears that the synapse itself is changed either in size or in capacity to provide greater abundance of the chemicals necessary to the synaptic contact. Although the structural basis for thought is not clearly understood, the best evidence suggests that creative thought is dependent on an adequate number of neurons and connections and is limited if these physiological components are injured by disease or accident. It appears also that the neurons must have a potency for activity and a tendency to facilitate an increase in function.

A closely related consideration is whether or not these complex functions can be learned by a young brain, a growing brain, or an incomplete brain. The cortex, often called the new brain is thought to be late in completion of its development in both an evolutionary and an individual sense. Its functions are also late in the evolution of civilization. Inhibition, modulation, and other civilizing and perceiving functions seem to be controlled in the new or the cortical brain and it seems also that growth is finalized late in this area.[6]

The insulation of the young brain with a fatty myelin is comparatively complete in certain of the sense perception and motor areas and largely absent in other and especially in cortex areas.[7] These uncovered sections acquire their myelin sheath in a developmental pattern of rather well-defined sequence. Functions, such as toilet training, are taught with little success prior to the development of adequate neural maturity. Lack of myelination appears related to leakage of impulses with consequent inability to separate and to co-ordinate movements in more complex groups.[8] It has been proposed that dullness may result from incompleteness, even permanent incompleteness, of this maturation process. For most children the development is complete about the sixth year. Perhaps the gifted mature early or perhaps the myelin is more adequate or perhaps the myelin development is more complete, providing for less leakage and for more complete control and separation of the facets in a problem.

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[6] Alfred A. Strauss and Laura E. Lehtinen, *Psychopathology and Education of the Brain-Injured Child*, New York, Grune and Stratton, 1947, pp. 18–27.

[7] Ward C. Halstead, "Brain and Intelligence" in *Cerebral Mechanisms in Behavior*, *op. cit.*, pp. 247–250.

[8] Lee J. Cronbach, *Educational Psychology*, New York, Harcourt, Brace and Co., 1954, p. 85.

Interest in the function of brain tissue and brain development leads naturally to the question of whether or not oxygen supply, metabolism, or some other measure of nutrition may eventually explain the difference between alertness and dullness. A limited number of substances such as alcohol, barbiturates, and ether do invade the brain. They all interfere with oxygenation and also with normal and intelligent behavior. Somewhat similar changes in metabolism and shifts in chemical balance accompany nervous breakdown or thought disorders though it cannot be assumed that these changes cause the disorder.[9] Increased understanding of brain function and of the effects which result from changes in energy supply may some day provide better explanations of high intelligence. Extensive conclusions are currently premature but it is justifiable to conclude that brain development and rapid learning are dependent on adequate nourishment, with the provision of vitamins and oxygen and with the exclusion of toxic and disease effects.

Careful and skeptical psychologists reject brash conclusions which imply that learning capacity will ultimately be explained only in physical terms and altered by physical treatment. These psychologists accept the view that intellectual potential is dependent on physiological differences and on organizations or patterns which appear extremely early. This potential may be reduced by deprivation or injury. In general, mature and complex neurological and brain structures go with capacity for cortical learning—abstracting, generalizing, inventing, and organizing. Ruth Strang has written:

> Gifted children are lucky. Theirs has been a particularly fortunate combination of heredity and early childhood experience. According to the French psychiatrist, Piaget, they are endowed with a certain organizing quality of mind that is able to see relations and to make deductions and generalizations. This quality of mind influences their development from the first week of life. It enables them to select

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[9] Robert B. Aird, "Barriers in the Brain," *Scientific American*, 194, No. 2, February 1956, pp. 101–106.

from their environment the experiences they need for their physical, intellectual, and social develpoment.[10]

Environmental determination of learning

Experience alters functional intelligence. While it is possible to think in terms of an intelligence hierarchy, roughly corresponding to the size of the cerebrum or the proportionate relationship of one part of the brain to another, it is equally a truism that learning is influenced by and dependent upon earlier learning. Every invention and every new idea must result from rearrangement or recombination of previous experiences. While the physiological structures may be vital in facilitating this recombination, they are likewise powerless without experience. Highly intelligent behavior does not result merely because the neurological structure is adequate to it, but more likely because experience and present situation combine to call out behavior in a person whose physiological equipment is adequate to meet the demands that are placed upon it. This relationship is a difficult one to understand and an important one to perceive in planning for the education of gifted children.

Ability is partly native and partly correlated with physiological structure, but it is environment which determines the use of that ability. It is probable that no trait is determined by heredity alone and in the development of giftedness we may accept the assumption that "nature needs nurture to round out its human possibilities." [11]

The nature-nurture issue has been widely reviewed and is generally known by teachers and professional workers.[12] Only brief reiteration may have value here. Early examination of this question began with family studies—the Kallikaks, the Jukes, and Galton's eminent men. Many of these studies were of degenerate families and most tended to have an hereditarian bias but in light of their careful documentation they cannot be readily dismissed. The challenge to these studies came from social psychologists who tried to improve intelligence through improving environment. Many of their experiments were conducted on American mountaineers over inadequate periods and with no control on the influxes of population which were induced by the improved living and cultural conditions which were brought about through the experiment.[13]

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[10] Ruth Strang, "The Psychology of Gifted Children," *Journal of Teacher Education*, 5, No. 3, September 1954, p. 215.

[11] S. George Santayana, "The Intellectually Gifted Child," *Clearing House*, 21, No. 5, January 1947, pp. 259–267.

[12] Guy Montrose Whipple (ed.), *Intelligence: Its Nature and Nurture, 39th Yearbook of the NSSE, Part II, Original Studies and Experiments*, Bloomington, Illinois, Public School Publishing Co., 1940.

Family histories have been supplemented by comparative studies which may be thought of in five categories. The first category constitutes studies of family relationships. The second category studies national families and has been somewhat confined to Negro–White comparisons[14] or to immigrant group comparisons at Ellis Island.[15] Conclusions from these studies are seriously limited through the lack of culture-free and language-free testing devices as well as through inadequate sampling of national groups. A third group of studies concentrates on the quality of environment, a fourth on the effects of foster homes and a fifth on comparison of identical twins raised together with those raised apart.

The environmentalist position has been most strongly supported by a series of studies at the State University of Iowa from 1937 to 1940. The Iowa group—Wellman, Skodak, Skeels, Updegraff, and Williams—report numerous evidences of extensive IQ change and particularly increases in measured intelligence following periods in nursery school or other enriching environments.[16] These studies were subject to vigorous attack on (*a*) selection of cases, (*b*) questionable statistical treatment and, (*c*) inadequate testing procedures. Even more significantly, the Iowa conclusions did not square with other studies such as those done by Burks where the conclusion was that heredity was a dwarfing factor accounting in total for 75 per cent or more of the intelligence variation for children placed in foster homes. On the other hand, Burks's conclusions were supported by numerous studies such as those of Brown, who computed a test-retest correlation coefficient of .88, or Hildreth who found a coefficient of .81.[17] Most studies show variability with IQ changes of less than five IQ points and correlation coefficients which lie between .80 and .95.

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[13] C. L. Nemzek, "The Constancy of the I.Q.," *Psychological Bulletin,* 30, No. 2, February 1933, pp. 143–168.

[14] Paul A. Witty, "Research Upon the American Negro," II, in "Intelligence as Related to Race," *Intelligence: Its Nature and Nurture, 39th Yearbook of the NSSE, Part I, Comparative and Critical Exposition* (Guy Montrose Whipple, Ed.), Bloomington, Illinois, Public School Publishing Co., 1940, pp. 261–269.

[15] Rudolph Pinter, *Intelligence Testing Methods and Results* (2nd Ed.), New York, Henry Holt and Co., 1931, pp. 446–470.

[16] Beth L. Wellman, "Our Changing Concept of Intelligence," *Journal of Consulting Psycholgoy,* 2, No. 4, July–August 1938, pp. 97–106.

From a practical point of veiw it is well to recognize that some changes are the result of specifically suitable environment. However, the changes are small, usually small enough that behavioral differences do not result at readily observable levels. It is further likely that proportionately smaller changes are achieved with gifted subjects. Studies at the Merrill-Palmer Nursery School show comparatively greater changes for children of lesser ability.[18] This differential effect may be attributed to the fact that experiences can be most adequately geared to the intellectually average or to the intellectually handicapped. Nursery schools like other educational experiences are designed to bring students up to a standard of readiness suitable for the next in a sequence of average experiences. These normal environments challenge average or dull children but may not be complex enough to provide motivations and experiences for exceptional youngsters. It could scarcely be hoped that school programs would make their greatest contribution to those students who have already met or passed expected standards.

In the case of Stephen and Pete, intellectual performance is rather obviously related to parental intelligence and to the environment which intellectual parents provide. Nancy and Kathy have been raised in a very rural environment where the parents' work and their day-to-day life call for few behaviors ordinarily classified as intellectual. Teachers often fail to discover high intelligence in such children. If the teachers knew this family well they would perceive not only ability in the children but both the ability and intellectual interests of the parents. The occupational and social demands made on Nancy's and Kathy's parents do not provide ready opportunity to demonstrate abstract intelligence in the degree that it is demonstrated by Stephen's parents or by Pete's parents. From casual observation, teachers may attribute the intellectual behavior of the girls too much to school and not enough to heredity.

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[17] A. W. Brown, "The Change in Intelligence Quotients in Behavior Problem Children," *Journal of Educational Psychology*, 21, No. 5, May 1930, pp. 341–350, and Gertrude Hildreth, "Stanford-Binet Retests of 441 School Children," *Pedagogical Seminary*, 33, No. 3, September 1926, pp. 365–386.

[18] E. K. Starkweather and K. E. Roberts, "I.Q. Changes Occurring During Nursery-School Attendance at the Merrill-Palmer School," *Intelligence: Its Nature and Nurture, 39th Yearbook of the NSSE, Part II, Original Studies and Experiments* (Guy Montrose Whipple, Ed.), Bloomington, Illinois, Public School Publishing Company, 1940, pp. 315–335.

Parent-child relationships for intelligence are about the same level (correlation coefficients of .45 to .55) as most of the relationships for physical traits such as height or weight. Many studies have used subjects of limited ability and the correlation coefficients have been lowered because one or another of the measuring scales was short. This assures that a correlation level of .45 to .55 provides a usable average and is conservatively low. The closeness of family relationship should not be ignored in planning programs for the gifted and especially should not be ignored in planning school co-operation with parents. Generally the parents of intellectually able children are capable enough to provide genuine opportunities for the children if educators will provide some of the direction.

The closeness of the family relationship is reflected in the similarity of intellectual function, the development of emotional life, and the patterns or ways of thought. Identical twins are most alike, then fraternal twins, then siblings, and so on. Similarity is greater for siblings of nearly a common age than for those with widely separated birthdates. The closer the genetic relationship and the more similar the experiences, the more persons look alike, behave alike, and operate alike, intellectually or otherwise.

Family relationships for personality, length of life, vocational pattern, and intellectual function are shown in Table 7. Obviously, the relationships cannot be attributed entirely to inheritance for one also inherits the environment which encourages emotional disorganization or emotional strength, which encourages learning or limits learning.

The most complete evidence on the effect of heredity should be found in experiments with infrahuman subjects, for only with animals is it possible to develop nearly adequate controls on heredity and environment.

Experiments have shown that certain learning abilities are subject to genetic selection. The best known of these studies was done by Tryon at the University of California and its conclusions are sig-

Table 7

Resemblances Between Identical and Fraternal Twins

Correl. Coeff.	*Identical Twins*	*Fraternal Twins*
Intelligence	.90	.70
Height	.95	.60
Motor Skill	.80	.45
Personality	.60	.50
Vocational Interest	.50	.30
Average Intra-pair Differences		
Vocabulary	2.0	4.5
Kohs blocks	1.6	6.5
Memory for digits	1.2	2.0
Digit-symbol learning	4.4	9.5
Controlled association	2.5	3.8
Motor coordination	12.4	14.5

Source: Henry E. Garrett, *General Psychology,* American Book Co., New York, 1955, pp. 56–57.

nificant.[19] The rats in the study were selected on the basis of their maze-learning ability. Interbreeding of the rapid learners produced a "bright" strain distinctly separated in learning rate from the offspring of "slow" learners. Rats in the seventh generation of one group so differed from the others that there was negligible overlap in their maze-learning scores with almost all "bright" offspring surpassing the best of the "dulls." Subsequently "bright" rats were bred to "dull" ones and the offspring spread over the whole scale with the majority demonstrating intermediate ability. In one generation the curve of learning ability looked much like that from which the experiment had begun.

Tendencies to accept a strictly hereditarian position must be moderated by awareness of the part motivation plays in learning. The motives which caused Tryon's rats to learn a maze are complex but immensely simpler than those which are involved in causing a gifted child to learn complex and abstract ideas. Differences in measured intelligence by social class cannot be attributed to simple differences in native ability for in some environments the abstract learnings not only go unrewarded but are punished.

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[19] Robert Choate Tryon, "Genetic Differences in Maze-Learning Ability in Rats," *Intelligence: Its Nature and Nurture, 39th Yearbook of the NSSE, Part I, Comparative and Critical Exposition* (Guy Montrose Whipple, Ed.), Bloomington, Illinois, Public School Publishing Co., 1940, pp. 111–119.

Mass testing or inadequate testing is likely to hide environmental effects on native capacity. A major problem in group paper-pencil intelligence-testing is ascertaining some commonality in reading experience. A child may not read adequately because reading is little valued in his home, or his vision or hearing is inadequate, or he is confused by a bilingual environment, or preliminary instruction was faulty, or his capacity is limited. Group testing with routine scoring and recording is not likely to discover which of the children is environmentally rather than natively handicapped.

It is commonly known that children of professional workers have higher measured IQs than children of skilled tradesmen and that children of skilled tradesmen have higher IQs than those of unskilled workers.[20] One may properly conclude only that intelligent fathers get prestige jobs and beget intelligent children. The relationship may not be readily assigned either to genetics or to experience. Professional fathers encourage and stimulate academic learning which translates itself into higher intelligence scores. Particularly, these parents encourage reading. Other parents prize reading less and their young children may not learn the basic reading skills so well. Then they may be expected to drop progressively behind as they grow older. Reading becomes more and more significantly involved in intellectual and academic growth; reading materials become more and more difficult; and the handicapped students become more and more unable to use their native ingenuity in school or in test situations.

Progressive losses in relative intellectual position have been demonstrated by numerous studies of barren environments. One of the early and famous studies used canal boat children on the River Thames as subjects. While the boats were tied up the children attended school. That amounted to about 5 per cent of the time. Their intelligence scores were low; but more important, older children had lower scores than younger ones. This study and several studies in Tennessee have been interpreted as evidence that losses occur as an effect of severely restricted opportunity. Most of the studies show decreases beginning about age eight or nine.[21] It is not now possible to decide whether similar declines occur in the pre-school period. The environmental deficiencies may be either more readily measured or more destructive in later childhood or adolescence. The lowering of the IQ may be in part an accumulation of learning deficits, though these deficits also reduce learning ability.

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[20] M. E. Haggerty and H. B. J. Nash, "Mental Capacity of Children and Parental Occupation," *Journal of Educational Psychology*, 15, No. 9, December 1924, pp. 559–572.

It is probable that individual testing would not demonstrate such large loss of position because reading and academic functions are somewhat less basic in the more individual intelligence tests. It is also evident that careful scoring of paper-pencil tests would frequently reveal the inadequacy of only one intelligence test score. If a child performed with significantly greater success on non-reading, non-academic items the informed scorer would surely note that the computed IQ should be suspect or even considered incorrect. A decline in measured IQ does occur in intellectually impoverished circumstances but the measured decline is probably greater than any real decline in intellectual function. Clearly, programs for selection or identification of the gifted are most likely to fail to discover those who come from an impoverished environment.

There is an accumulative limiting effect from inadequate environment but there is less evidence that remedial efforts and enrichment increase intelligence. Small increments in performance have been made when deprived children have been provided with enriching opportunities.[22] These limited increases in functioning level do not alter the generalization that intelligence in terms of maximum potentiality is relatively fixed. The maximum level is comparatively closely related to family level. In the Speyer School, Hollingworth found that a group with mean IQs of 154 had siblings with mean IQs of 129. Terman likewise found that twelve hundred times as frequently as expected he selected a gifted child and then discovered another in the same family.[23] The top expectation for children may be relatively fixed by heredity but that level will not be attained in an environment short in the physical, cultural, and emotional supports.

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[21] Lester R. Wheeler, "The Intelligence of East Tennessee Mountain Children," *Journal of Educational Psychology*, 23, No. 5, May 1932, pp. 351–370.

[22] Helen C. Dawe, "A Study of the Effect of an Educational Program Upon Language Development and Related Mental Functions in Young Children," *Journal of Experimental Education*, 11, No. 2, December 1942, pp. 200–209.

[23] Lewis M. Terman *et al.*, *Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. I, Stanford, California, Stanford University Press, 1925, pp. 49–54.

Rapid growers soon surpass the intellectual demands of society and we know from Terman that most gifted children come from communities which are average or just slightly superior. Many of their homes are adequately supplied with academic materials but woefully short of parental stimulation since the parents are more than averagely involved in economic pursuits and in community organizations. By extrapolation, it is reasonable to suppose that most gifted children have outgrown the resources and the stimulation of their community by the time they reach elementary grades and that most schools have not discovered remedial techniques appropriate in their cases.

Stephen serves as an example of the intellectually apt child surrounded by academic materials and stimulation. His environment is short in a fundamental way. Urbanized life and organized schools cause Stephen to work and to play with other seventh graders and, for the most part, only with seventh graders. His social motivations cause him to accept the thought patterns and the cultural interests which are approved in his set. These standards are less mature than his home standards and rarely require his full participation.

An appraisal of environment for gifted subjects is likely to be undertaken in terms of libraries, size of school, and professional services. These are important but considered alone they are misleading criteria. On such standards, Nancy and Kathy were deprived in their childhood. That conclusion ignores the enrichment which they received through extensive relation with older children and adults, through forces which encouraged independence, self-dependence, and responsibility, and through satisfactions which came from the pleasures of reading, drawing, and discussing. Standards appropriate for judging an environment for its suitability to gifted children must be very complex if they are ever developed.

Neither the effects of heredity nor the effects of environment are immutable. Teachers may wisely respect the realities of physiological limits but what these are for persons with IQs of 130 are simply unexplored and unknown. A best guess suggests that these limits are well beyond current standards in the school or in communities and are probably well beyond our imaginings. It is vitally important to enrich and enlarge the environment of gifted children.

Sex differences: nature or culture?

There is a persistent belief that the sexes differ in intelligence. Resolution of the question is difficult because specialization of functions and social requirements soon confuse all measures of original capacity. Highly intelligent behavior may not be expected from one of the sexes, may not be recognized, or may not operate in the observed behavior. It is possible that this failure to note intellectual behavior may make sex comparisons most inadequate at the higher reaches of ability.

It has been proposed that there is a greater male variability with more dull, more gifted and fewer average than there would be in a female sample. Evidence is ordinarily quoted from the larger portion of males among institutionalized morons. This, however, does not demonstrate that more men are morons. It may demonstrate that our society is more ready to institutionalize male than female morons or that the society more readily makes a place outside institutions for moronic women.

The question of superior ability is at least as complex. Cultural differences in expectation, education, and recognition are so numerous and so complex that valid conclusions are necessarily vague. Havelock Ellis found only fifty-five women among 1030 British geniuses and Cattell found only thirty-two among the one thousand most eminent persons in the world. Furthermore, the majority of these women were eminent through accidents of heredity, physical beauty, or tragedy. From these and other data Ellis averred that women were the stable, conservative element in evolution and that men had the wider range of capacities.

Experimental comparison of intelligence for the sexes has ordinarily compared the middle ranges. The conclusions have been mixed with boys superior on Porteus or other maze tests, in mechanical and space perceptions, in puzzle boxes, on form boards, in numerical and arithmetic reasoning, and in computation and mechanical aptitude, while girls were more accomplished in verbal and linguistic skills and in memory and mental imagery.

Studies of superior children are perhaps slightly more decisive but not conclusive. A study in Kansas found a boy-girl ratio of 104/100 with IQs above 140 distributed in about the same relationship as the school population. Several other studies using group tests which are highly verbal found ratios in favor of girls with one of these as high as 146.3/100.[24] In the Stanford *Genetic Studies of Genius* the boy-girl ratio was 121/100 and this ratio was later reduced to 116/100. The school population was 104.5 boys per 100 girls; the gifted sample contains at least 111 per cent of the expected number of boys and approximately 90 per cent of the expected number of girls. Furthermore, the siblings of the gifted were predominantly male in the ratio 123.35 to 100. The boys in the sample were not superior to the girls in the sample but they were numerous enough to indicate statistically greater expectancy for intelliegnce above IQ 140 among boys.[25]

Explanations of the Stanford data are most difficult. The test used was the Stanford-Binet and extensive research during the construction of the test and since shows that boys and girls do about equally well on it, age for age. This test, like most others, has been criticized for verbal overloadings which should have given any possible advantage to girls. It has been proposed that parents are more ready to volunteer boys than girls for experimental studies. There is some evidence that this is generally true, but it scarcely explains the differential in the Stanford studies. Nominations were 109.7 boys to 100 girls, and the ratio of those qualifying was 135.3 to 100. Therefore, boys were actually more able than the nominators guessed and girls were less able. Further, the survey of subjects was so carefully accomplished that Terman estimated that 90 per cent of all those who could qualify were included. It would seem unlikely that biases in selection or in the test could explain the preponderance of boys in the group or in the families from which they came. Indeed, no very adequate explanation has ever been made.

Generalizations

The adaptive problem-solving functions of gifted people are seen in behavior which is characterized by newness, generalization, judgment, invention, insight, and symbolization. This function is congenitally based in that it requires physiological structure and perhaps also in that intellectual organization or perceiving must be accomplished through some previously organized perception. Intelligence is not, however, a primordial capacity set only by genetic pattern and germinal variation. It is, rather, a description of present organization or ability to function which has been derived from experience to the degree that native capacity allows.

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[24] W. Drayton Lewis, "Sex Distribution of Intelligence Among Inferior and Superior Children," *Journal of Genetic Psychology*, 67, September 1945, pp. 67–75.

[25] Terman, *op. cit.*, pp. 49–54.

The degree of interaction between physiology and experience is unknown; but in any case, individual intelligence is amazingly constant and persistent, amazingly widespread and pervasive in its functions, and self-creating, with each intelligent or well-organized response providing a base for the next intelligent or well-organized response.

The source and the nature of high intelligence are shrouded in human behavior so complex as to be almost inexplicable and inscrutable. Nevertheless, planning for gifted people might be guided by some conclusions:

1. Upper limits of learning rate are comparatively constant since they result from differences of a physiological and hereditary nature.
2. Learning level is peculiarly dependent on the central nervous system.
3. Functions limited to beings with complex nervous systems are those which involve modification, restraint, association, and judgment.
4. Impairment of potential from toxic, emotional or accidental conditions is most likely to occur before six years.
5. Impairment interferes more with new than with old learning and it may require more ability to learn than to retain.
6. Environmental influences are accumulative and determine the degree to which a gifted person uses his ability.
7. Effects of environmental change have been most conclusively demonstrated in cases of extreme deprivation or in cases of limited ability. The effects of a limiting environment on measured intelligence and academic learning may largely result from reduced motivations.
8. Able girls are more likely to be identified than are able boys.

8

Considerations of Learning and Teaching

> In such an instance we come close to the root of the whole cultural problem, the inherent weakness of all modern literacy: it is half-baked and arrogant. It trifles solemnly with the externals of things, neglecting even the surfaces or the handles by which a truth may be seized: it goes like a child for the false glint or striking triviality of detail.
>
> Jacques Barzun, *Teacher in America*[1]

There is very little information on how gifted children learn. There are a few rather inadequately demonstrated conclusions from experiments with children. There is a sizable body of introspective and opinionnaire data on how gifted children think they learn. Finally, there is a body of general learning theory from which certain principles may be tentatively extrapolated. This inadequacy of principles is disconcerting for schools faced with the immediate necessity of educating Stephen, Nancy, Kathy, Pete, and thousands of other gifted children.

Popular concepts of learning overemphasize *exercise* or practice, teacher-controlled *reward and punishment*, and *teacher presentation*. Emphasis on acquiring the packages of fact limits transfer, causes learning to end with the end of teaching, continues dependence on adults, discourages the development of creative individuality, and perpetuates superficial or memoriter learning. A number of educational critics have favored a "teacher tell—student repeat" kind of school. This would be particularly inappropriate to gifted children who, according to the best evidence, learn through (*a*) complex methods, (*b*) discovery of generalizations, and (*c*) independent work.[2]

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[1] Jacques Barzun, *Teacher in America*, Boston, Little, Brown and Company, 1944, 1945, p. 279.

Presentation followed by repetition is not the learning way for gifted subjects. A company which produces scientific equipment has advertised seeking personnel and offering conditions suited to personal development.[3] The advertisement indicates that company growth depends on the growth of the scientists employed. It further describes the conditions for growth as these are listed by staff members who are experts on gas dynamics, aerodynamics, and nuclear weapons. These conditions could also serve to describe a nurturing environment for gifted children for they include:

1. Top level associates (especially for young scientists)
2. Technical sophistication (work that challenges the person's top ability)
3. Atmosphere of inquiry (healthy questioning)
4. Freedom from routine (relief from rote)
5. Small company (or working family)
6. Stability of organization and arrangements (personal security)

Better schools reject the pour-until-full approach to teaching but have not always offered justifications which are understood and accepted by parents and critics. The schools cannot readily turn to learning theory and find a complete and adequate set of guiding principles. These theories themselves are incomplete and are so dependent on studies of animal subjects and studies of simple or rote tasks that they provide only limited and hypothetical explanations of the special learning abilities of men. Such an observation does not mean that laboratory psychologists make no contribution but rather that laboratory studies of learning are directed toward resolution of specific issues and are currently inadequate for the teacher of the gifted who is faced with important decisions that cannot wait upon theory.

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[2] Ruth Strang, "Psychology of Gifted Children and Youth," *Psychology of Exceptional Children and Youth* (Wm. M. Cruickshank, ed.), Englewood Cliffs, New Jersey, Prentice-Hall, Inc., 1955, p. 498.

[3] AVCO, "Advertisement," *Scientific American*, 194, No. 2, February 1956, p. 157.

The dilemma is not hopeless. Teachers are in precisely the same situation as physical scientists who make great advances despite serious deficiencies in the theoretical explanation of the phenomena with which they deal. It is entirely fitting to contrive the best theory possible. That theory must be drawn in the knowledge that experimental evidence is sparse, that popular judgments frequently prove unsound because careful observations have not been made, and few persons have experienced learning in the manner of the gifted. Obviously the accepted principles are recognizably tentative and much in need of experimental verification.

Qualitative Change: the Basis of Learning

Gifted learning is characterized by increasing adequacy of perception and organization more than by simple accumulation. It is less additive (quantitative) than usually supposed and is more organizational (qualitative) as finer discriminations and simpler orders or arrangements increase the validity of perceptions and behaviors. It is, in large part, a matter of noting differences and seeing distinctions that previously had no meaning, or fitting together experiences in terms of new meaning.

A simple illustration of this principle is found in "learning a person"—becoming acquainted. Your neighbor tells you the vacant house at 907 has been rented to a Mr. Dubilischuck. Your acquaintance at this point is complete, though very sketchy. The name Dubilischuck perhaps suggests the picture of a large, dark man with a booming voice and a fur hat. Next day you learn the newcomer is an Episcopalian minister. From your experience, this is a man of another kind. The Episcopalian ministers you have known were slight, scholarly, white-haired men. You alter the total view not by adding your concept of Episcopalian minister to Dubilischuck but by organizing what you know from a new orientation or set of beginning assumptions. Each new piece of information changes rather than adds to your perception. Your children report on his five roughneck offspring, your wife faithfully describes the beautiful furniture unloaded from the moving van, you meet Dubilischuck, you golf together, you hear him talk of his past. Each time he is better known; not just more known but more exactly or more adequately or more really known. His value or relationship to you is more adequately perceived. Above all, he is more clearly differentiated from other people.

Children learn in this way also. First, they know that the parent tells a story with a book in hand, then that the story is in the book, that the story is in the printing, that each piece stands for a word, that the words differ, that these differences tell the parent which word he is to say. There is a continuous reshaping or readjustment of perceptions. Soon the child "reads" from pictures and memory, then from a word here and there and then from sounds. Eventually, the "reading" closely fits the story in the book. In a search for a story, the child starts with vague general understandings and moves toward more definitive and more exact knowledge.

Children frequently know the make and model of a car but are unable to point out specifics essential to the identification. An illustration of this principle is found in aircraft recognition. Air-gunners who knew the specifics of length-width ratios, shape, and markings treated friend and foe with some impartiality. Experimentation led to training through the flash-picture technique, whole planes first, then specifics. Accuracy and speed were both improved. Essentially this phenomenon seems to be explained by the fact that the person operates on his "best hunch" or best perception from what he senses or knows. When the knowledge is scattered or superficial, he makes errors but he seeks a better or more complete explanation.

Essentially, this is the scientific method of "hypothesize, test; adjust the hypothesis and retest." This might be called a "leap and test" approach and it is more easily observable in the learning of gifted children than in that of average children. This should be expected. The gifted generalize or jump to hypotheses which are more removed from the observable data. Surely the step-by-step approach is more necessary for the less able. Perhaps they too move by "leap and test" but the leaps are much shorter and may appear like orderly and logical thought.

Since gifted children react more readily they need less conditioning to clues. They see or understand the shape or intricacies of objects with less handling than that required by a more limited person. More of their handling or experiencing can be visual or intellectual.

An example of visual handling is found in Stephen's ability to assemble the *O'Connor Wiggly Blocks*.[4] Most subjects try each of the nine pieces several times and in many different places. Stephen looked, lifted and placed each piece in its proper position with only one exception; one block was lifted, then studied, reversed, and placed; but none of the blocks were "tried" in the sense of being fitted, found inaccurate and removed. Learning from intellectual hypothesizing is sometimes called insightful as differentiated from trial or experienced learning. Undoubtedly, all learning involves experience but gifted people seem to need less of the obvious or externalized experience.

If we accept the conclusion that much learning is rearranging or fitting together details of experience in the light of increasingly effective differentiations and that these rearrangements are possible for gifted people more readily and with less repetition than that needed by other subjects, we might draw some conclusions about school practice.

1. *Reading instruction in the modern elementary school provides the best example of teaching methods suited to education of gifted people.* Reading is like thinking itself. Gifted children are nowhere more advanced in academic skill. They begin with the purpose of "getting the story." The first efforts are vague and imprecise but gradually they become expert and the "story" conforms to the print. There are some critics who advocate the accumulative method of alphabet first, then single sound, syllables, words, and sentences. This "sound by sound and syllable by syllable" [5] approach is very unlike the natural learning of gifted children. The thought approach allows more "errors" or miscalling of words in the early stages but assures greater speed, more smoothness and finer comprehension later.

The word-building conception seems, at first, at least to explain poor reading. It does not explain skilled reading with its sweeping, loping movement, noting phrases or words more than letters or syllables. Such good readers scarcely pause when type is imperfect or a letter is substituted. Even poor readers do not "fix" a sound at a time.

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[4] J. O'Connor, *O'Connor Wiggly Block*, Los Angeles, Western Psychological Services.

[5] Rudolf F. Flesch, *Why Johnny Can't Read*, New York, Harper and Brothers, 1955.

They may have to fix a word several times for their perceptual patterns are imperfect and they must keep peeping to fill gaps with sensory detail.[6] Poor readers must continually go back and re-establish details where excellent readers are carried along by the meaning. Remember Dubilischuck? Suppose that you now know him well. In a storm you meet him with his hat covering his eyes and his coat covering chin and ears. You shout, "Hi-ya, Dub!" You do not say to yourself, "Chin, type *r*, mouth, shape *x*, eyes, size *b*," and so on to a formula which means Dubilischuck. On the contrary, you see the person. You may then note that his mouth is unrecognizably swollen from a trip to the dentist, or that an eye is black and shut or that some other detail differs from normal. If that detail should be great enough to confuse your recognition, it will probably be only a moment until some other clue returns the complete perception of the person.

Like 43 per cent of gifted children, Nancy read before going to school. She loves reading and she reads well. At age three, she would sort the mail saying, "This is for Mommy," or "Daddy, this is yours," or "This is Nancy's." Was she reading? In broad terms, yes. It is probable that she used clues other than writing and used them more freely than the address itself. Color of envelopes meant something. Perfumed letters were surely for Mother or for Nancy. Letters with little windows in the front were for Daddy. We cannot be certain what the clues were but we can be fairly certain that reading was not done phonetically or step by step.

At this age she began other reading—to her sister or to herself. A well-loved, often-read book, a careful look at the picture and Nancy "read" or told the story to Kathy. Very soon, certain of the words were recognized when they were on the right page, and a little later they were recognized wherever they appeared. Shortly after that, unknown words were spelled aloud so that Mother could assist her. Nancy's learning was much like that of a youngster quoted by Ruth Strang:

> My mother and father were firm believers that books play a very important part in a child's life. When I was about one or two years old

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[6] Harry Grove Wheat, *Foundations of School Learning*, New York, Alfred A. Knopf, 1955, pp. 185–193.

> my mother or father read to me every night and afternoon. After a month or two of constant reading of my favorite stories over and over, or the reading of a poem, I learned them by memory. I was about four when I would sit down by myself, and telling by the pictures which was the poem or story presented, I would act as if I was reading. Soon I could distingiush words or sound them out.[7]

These children "make sense all the way." Starting with vague perception, they gradually differentiate between exceptions and reorganize the known parts to increase the effectiveness, accuracy, and speed of their reading. They approach reading as teachers would teach it, from purpose and meaning to the details. In the beginning "boy" and "dog" are differentiated vaguely by the picture on the page, then by the word shape and eventually by sounds and by letters. Phonics, like tire chains, serve "in sticky places" but not as a fundamental means of propulsion.

2. *The advantages of the whole method are greater for gifted children.* Research shows that gifted children profit relatively more by use of the whole methods in learning than dull groups do. McGeoch studied the whole-part effects on gifted and average children when they were learning nonsense couplets, Turkish-English couplets and a brief poetic selection. Large-unit methods proved generally more suitable to gifted children though only small effects were demonstrated in poetry probably because the selection was so short—twelve lines—that it really could not be subdivided. Some of these data are summarized in Table 8 and they support the probability that topics which provide for organized meanings or wholes give marked advantage to gifted children. This is consistent with the conclusion in Chapter 6 that giftedness includes the ability to develop a simple, coherent, and organized perception. This perception is whole or comparatively complete and a similar wholeness or completeness marks the good learning situation.

3. *Education suitable to the gifted is intentionally exploratory, characterized by the problem-solving approach, self-direction, guidance-teaching and workshop methods.* A pattern of routine assignments and organized recitations within a restricted curriculum denies scope and forging ahead, limits individuality and creativity and inhibits the development of intellectual self-dependence.

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[7] Ruth Strang, *op. cit.*, p. 490.

Table 8

Proportionate Learning and Retention for Gifted (IQ 140+) and Average (IQ 95–105) Children on Miscellaneous Material

	31 Gifted	*32 Normal*
Whole		
Learned	6.49	3.10
Retained	5.28	2.26
Part		
Learned	3.27	1.90
Retained	2.78	1.00

Source: G. O. McGeoch, "Intelligence Quotient in the Whole-Part Problem," *Journal of Experimental Psychology,* 14, No. 4, August 1931, pp. 333–58.

The Hunter College Elementary School in New York City has developed a program of self-directed learning and guidance training.[8] This program views learning as resulting as much from the growing insights of children as from specific instruction. Teaching is seen as a matter of arranging conditions in which children may experiment and explore from their own promptings. There is an attempt to guard against rote memorization and to capitalize on the gifted child's ability to plan, reason, generalize, discover principles, and draw conclusions. The Hunter people feel that such an education promotes self-reliance, flexible attack on problems, and the acquisition of study skills and important information.

Reasoning or problem-solving ability does not appear suddenly or in full bloom, neither does it develop instinctively to optimum level. There is a considerable body of evidence which shows that critical thinking, reasoning, creative thought, and problem-solving are greatly enhanced by certain teaching methods. It is particularly important not only to practice reflective thinking but actually to examine and study the methods of thinking. Several experiments have used geometry to teach systematic thought. One of these experiments demonstrates extensive gains in reasoning scores when geometry was taught in such manner as to emphasize thought processes such as postulation, generalization, reasoning by analogy, detecting assumptions, and the nature of proof. The extensive gains encouraged by this different approach are shown in Table 9.

[8] Gertrude Howell Hildreth, *et al., Educating Gifted Children at Hunter College Elementary School,* New York, Harper and Brothers, 1952, pp. 68–109.

Table 9

Gains in Reasoning Scores Through Teaching Geometry and Through Teaching Geometry in an Experimental Plan (Emphasizing how Reasoning is Accomplished)

Group	*Mean Gains (Reasoning)* *IQ 99 or less*	*IQ 100 –119*	*IQ 120 or more*
Experimental	24.2	25.2	30.7
Geometry control	5.0	8.3	13.4
Non-geometry control	5.1	5.1	4.0

Source: G. Ulmer, "Teaching Geometry to Cultivate Reflective Thinking: An Experimental Study with 1,239 High School Pupils," *Journal of Experimental Education,* 8, No. 1, September 1939, pp. 18–25.

Rote learning of teacher-determined behaviors appears to be relatively more effective in the education of retarded children. These latter are less plagued with questions of cause and may be happy, productive citizens using habits and responses which have been carefully selected by wise and kindly adults. The gifted with their increased capacity for higher mental process require education that differs sharply from the routinized kind designed to achieve predetermined and specific outcomes. Education for the gifted implies:

1. *A program organized around unit topics, projects, or study themes.* There is some reason to propose the whole method for all students but its greatest advantages are found in work with adults and brighter children.
2. *Lessons organized around a problem or a purpose.* It is proper that in some of these, the severe arrangements of formal logic will give way to psychological organizations that are more truly characteristic of unsolved problems.
3. *Encouragement of side issues which develop incidental and concomitant learning.*
4. *Special emphasis on the tools of workshop learning.* These include reading skills, individual study, finding materials, observing, graphing, reporting, orderly disagreeing, and appraising opposing viewpoints.[9]

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[9] *Ibid.*, pp. 86–98.

5. *Informal classrooms with reference works more frequently used than texts.*[10]
6. *Increasing awareness of the learning process on the part of the learner.* Effort is expended toward insuring his participation in focusing and systematizing his work.
7. *Student involvement in planning or at least awareness of what the expected learnings are.*
8. *Participation in periodic evaluation.* Gifted children in the regular classroom should be encouraged to serve in discussions, as the person who says, "This is where we are," "This is the issue on which we disagree," or "Perhaps this would help."
9. *Student summaries which require rearrangements and conclusions as differentiated from reiterations and repetitions.*

4. *Activity should not be the measure of adequacy in an educational program.* It has been commonly observed that creative productions tend to follow periods of contemplation or withdrawal. Knowlson and others have contended that such periods of inactivity following ardent inquiry and reflection allow conjunction of the unconscious or remote thought with the conscious or current thought.[11] Actually all higher processes seem somewhat separated from the activity itself. Thought or higher processes provide an internalized attack or an indirect meeting of need. They involve delayed response and they lack observable behavior which occurs between the stimulus and the response. There is less active trying out of solutions and more quiet evaluation. Contemplation seems essential but this does not mean that the inspirational work of the artist or the complex work of the thinker is independent of sense awareness or of the external world. Activity is the source of thought material and provides reality tests of the ideas.

Very vigorous activity is generally not conducive to critical thought or to problem solving. Internal stress which leads to overt behavior may create emotional impulsiveness and reduce thought. Higher processes are less "urgent" and not closely attached to a goal. The goal-blinded learner does not evaluate himself, does not readily turn from considering ends to contemplating means, and does not substitute inventive behavior for familiar habits. He cannot stop behaving to think.

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[10] Merle R. Sumption, Dorothy Norris, and Lewis M. Terman, "Special Education for the Gifted Child," Chapter XIV, *49th Yearbook of the NSSE, Part II* (Nelson B. Henry, Ed.), Chicago, Illinois, NSSE, The University of Chicago Press, 1950, p. 266.

[11] T. Sharper Knowlson (Thomas Sharnol), *Originality, A Popular Study of the Creative Mind,* Philadelphia, J. B. Lippincott, 1918, pp. 87–124.

Pioneer faith in action and work, the belief that idleness leads to sin, and materialistic demands for production have converged in the North American to produce both an unusual willingness to try and a faith in effort. The advent of the activity school into such a culture caused some immature interpretations which valued doing for doing's sake. Though such "pot-boiling" in education was not generally advocated it was widespread enough to overemphasize the value of large muscle activity in learning. In its worst manifestations students were overinvolved in making models, pasting scrapbooks and presenting pageants while giving little attention to the real life models or to the cultures which they described.

Good learning situations provide opportunities to "try out." Well-planned activities encourage students to discover their errors and to alter their behavior. An addiction to activity for its own sake reduces these judgmental and inventive possibilities and is destructive of critical and creative learning. The urge to do, to accomplish, and to show accomplishment may interfere with the proper education of gifted children. It is possible to read so extensively that there is little time to consolidate or taste what is read. The number of answers rather than the quality of answers becomes the goal.

At any age level the excessively busy society, the bustling home or the feverish classroom may be detrimental to thought and to learning the higher processes. The very able student is frequently encouraged to participate in many student and social activities as well as extra academic interests. Such a student will probably meet required standards more than standards appropriate to his ability. It is likely that complex and inventive rearrangements of learning are avoided and no groundwork is laid for continued learning and invention. Gifted students are comparatively successful when they undertake several divergent tasks but this does not prove the wisdom of such a course.

5. *Practice is a lesser part in learning of the gifted, but drill has a place.* Gifted children work because they grasp the significance of the task whereas many other children work for the teacher or because

they fear the consequences of not working industriously. When the significance of the task is known the gifted child is usually willing to practice and learns with few repetitions. It has been pointed out that the mentally superior child attends more consistently, corrects more easily, grasps more readily, and is handicapped by pace suited to the average.[12] The pace in such cases is largely set by the number of necessary repetitions.

Gifted students profit relatively less from practice or rote experiences. They do not learn less in total amount but do learn less in relation to their capacity. If in a problem solving lesson, *A* learns 7/8 of all the material presented and *B* learns 4/8, we may expect a quite different ratio in a practice or rote lesson. *B* may increase his learning to more than 4/8, perhaps to 5/8. *A* will likely drop in efficiency from 7/8 to perhaps 6/8. This differential in the value of practice may result from differentiated degrees of participation. Numerous studies show that participation is an essential in learning and that recall is related to the degree of participation. Since most rote tasks fail to challenge gifted people, it is likely that their participation is at some level below maximum.

Gifted children learn in informal and ingenious ways and with little apparent effort. Observation of this phenomenon has led some people to assume that there is little need for drill and that rote learning induces boredom and destroys motivation. They contend that studies which would be monotonous for the gifted are not so for the dull and that rote method should be confined to the less able. It is possible to overestimate the burdens and the inhibitions which come from routine. Gifted people persevere and under reasonable guidance they may be expected to judge their own progress and impose on themselves whatever routines are necessary to successful accomplishment of goals. Self-imposed controls and self-directed drill are normally observable in gifted children but this need occasion no extensive sympathy. Gifted students organize their practice and they see its value. In this way it is less burdensome than mere repetition or truly rote learning.

The reproduction of Nancy's writing and Kathy's printing indicates the standards which the children set for themselves. They are well co-ordinated and self-evaluative. They have been encouraged to view themselves as children who meet expectations. They accept the importance of writing and they extend themselves to meet standards of accuracy and neatness.

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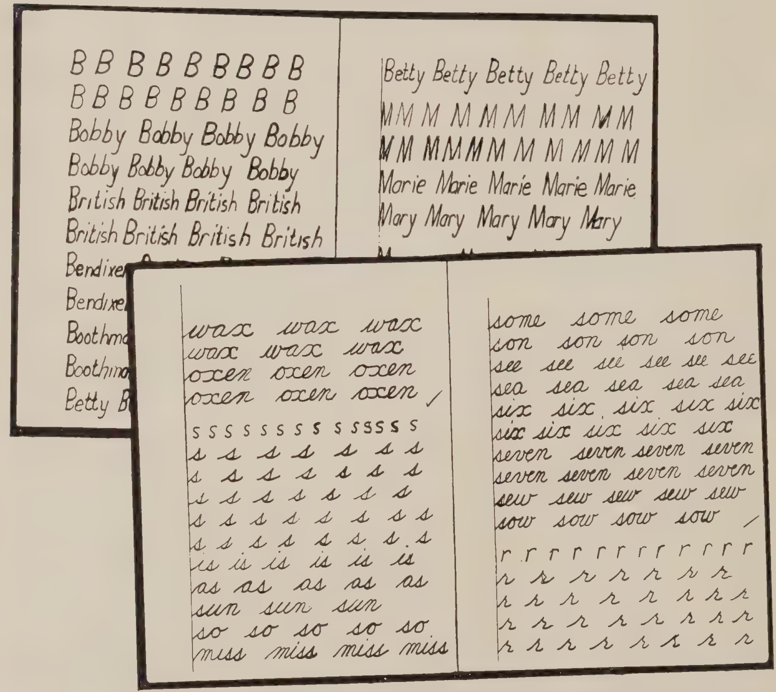
[12] Howard L. Kingsley, *The Nature and Conditions of Learning,* New York, Prentice-Hall, Inc., 1946, p. 325.



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Young gifted children work patiently and carefully on drill tasks if the outcomes seem important. Kathy's printing (First Grade) and Nancy's writing (Second Grade) illustrate painstaking care.

Explanations of learning by continuous repetitions have largely been replaced by reinforcement theories which explain the value of repetition in its effectiveness in need reduction. These current tendencies emphasize practice with a purpose or for a reason causing the learner to note, judge, and improve his own behavior. Practice is viewed as an opportunity to try out. Because gifted students are capable of monitoring themselves, they can learn to detect and eliminate errors and recognize cues that are useful. Practice, from this view, is very different from rote. When performed in context or with meaning for the student, repetition serves to reduce error and to perfect skill.

Practice further serves to develop expertness in the sense that an expert is aware from very slight clues that he is making an error and adjusts without damage or waste of time. Skills, language usage, basic mathematical operations, and many of the chores of living are most effectively accomplished when they are practiced to a high degree of overlearning. When these have been reduced to habit, the gifted child can attend to more essential tasks without distraction. Incidental practice may be too scattered, unrecognized, or limited; organized drill is needed for some of this training.

The rules of practice for the gifted are essentially those for all practice—self-recitation, proper length and spacing of practice periods, suitable demonstration, monitoring, and the selection of appropriate tasks. The most common error in teaching drill material for gifted subjects is inappropriate placement. Drill and routine practice is particularly discouraging if it comes after the material has been learned or when a substitute skill has been learned. An example of inappropriate level can often be observed in mathematics. The vast majority of the class may be just undertaking multiplication; they require many illustrations before they develop enough understanding to commit the "times tables" to memory. The gifted child understands the operation early and ought to be assigned at once to perfect his use of the tables. When this is not done, he devises other methods for computing products. When the tables are prescribed his ingenuity is great enough so that he can operate competitively with the class without learning the tables. In high school or college he dislikes mathematics or does poorly because he was not required to learn the basic skill which now should underlie his work in almost automatic response.

Reasons given by several subjects in the Stanford studies for failure in college include habits of idleness, inadequate work habits or rejection of routine. They attributed these inadequacies to their previous school experience.[13] Teachers of the gifted must expect high standards of performance. It is reasonable to require memorization of materials if (*a*) the purpose or value is understood, (*b*) the method for learning is explained, (*c*) the requirement is introduced at an appropriately early level, (*d*) the material is adequately subdivided and demonstrated, (*e*) the material is used from time to time, and (*f*) the selection of drill material can be justified in terms of permanent value.

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[13] Lewis M. Terman, *et al.*, *The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group, Genetic Studies of Genius,* Vol. IV, Stanford, California, Stanford University Press, 1947, p. 157.

6. *Gifted subjects introduce large amounts of error in their learning.* The simplest explanation of this phenomenon lies in the greater creativity of people with high ability. In a given situation, one student may see two possible responses and both are much like previous behavior. Another student may see five or six possibilities, some of which are hypothesized on remote experience and may for this reason appear as very poor trials. In the latter case, the student has the possibility of making five times as many errors as his friend though some of these will be unobserved mental tries. Because he has insight, he will wish to try out each solution; only in this way can he spot the inappropriateness or the goodness of a hunch. In the end he has made more errors—not all observable—but he has learned more adequately because he has differentiated and excluded errors which may later arise in the behavior of other students.

While dull children find it difficult to persist in any activity, they continue what they do without essential change. Therefore, if the model is correct and the dull child responds correctly in the beginning he is likely to continue without change, even when bored. Not so with the gifted. These latter escape boredom by variations or changes in the task and such changes introduce error.[14] Interesting evidence on this point was discovered by Lewin who asked a group of feeble-minded and a group of normal children to draw "moon faces" as long as they would. The model was a circle with two small circle eyes, a straight-line nose, and a line mouth. The feeble-minded group stopped when the task became too monotonous. The normal group enlivened it—they drew eyebrows, button noses, hair, teeth, slant eyes, glasses, ears, and mustaches. The addition of new features greatly increased the possibility of imperfection. Nevertheless, the ability to make adaptive modifications is a basic part of mental flexibility or creative intelligence.

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[14] Florence L. Goodenough, *Mental Testing*, New York, Rinehart & Company, Inc., 1949, p. 522.

Errors arise less because some learning has been lost than because some learning has been changed. When a situation occurs the learner reacts as reasonably, or creatively, as he can. When the situation recurs he reacts as reasonably as he can, but not necessarily in identical fashion. In the interim he has learned other things and now his most reasonable reaction differs because it includes the new learning. The change from previous behavior may make his reaction appear incorrect. Other learners may seem to react correctly in the second situation simply because there has been a paucity of intervening learning or reorganization. Gifted children with much intervening experience may try new solutions and make errors.

Errors are also introduced because gifted learners associate or transfer easily. When an ape responds "correctly" in a problem situation we may not assume that the problem is identical with that seen by humans. Hens have short memories.[15] In the hen's case it seems unlikely that the complexity of a learning problem is much increased by learning transferred in. However, human learning is greatly influenced by memory, and errors may well come from poorly learned or partly learned material which is very old. The person who most clearly recognizes the relationships of a current problem to other problems may be the person who finds solutions most difficult.

The increase of error with increase in transfer into the situation has recently been demonstrated with "maze bright" and "maze dull" rats at McGill University.[16] As expected, bright rats learn the first or *T* maze most readily. Both groups are then placed in a *Y* maze, allowed to explore; and then returned to the *T* maze. The interpolated experience affects relearning of the first or *T* maze for both groups but much more severely confuses the brights. Bright subjects at human or infrahuman levels transfer more into the situation than dull subjects; thereby, they increase the complexity of the problem and the likelihood of error.

The creative variability of response, the increased sensitivity to clues, the large transfer into a situation, and more rapid reorganization combine to produce many more tries and much more variable tries

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[15] A. M. Guhl, "The Social Order of Chickens," *Scientific American*, 194, No. 2, February 1956, pp. 24 and 42–46.

[16] William R Thompson and Asher Kahn, "Retroaction Effects in the Exploratory Activity of 'Bright' and 'Dull' Rats," *Canadian Journal of Psychology*, 9, No. 3, September 1955, pp. 173–182.

than those characteristic of duller students. At a point of comparative incompleteness in learning we may expect large error scores from them.

Penetrating learning is impossible without the opportunity to make an error, to recognize why it is an error, and to correct. Good teaching, within limits, controls the number and severity of errors in the learning process. Good teaching anticipates error, allows it, and works toward rapid elimination of error in the teaching of gifted students. With good learners, the unlearning involved can be insightful and rapid, and in the long run provides for a more thorough mastery of content. This may not be the case for borderline or dull students. It is, therefore, recognizably difficult to test at various stages of completeness in a unit. Right answers at one stage in understanding become wrong answers at another and the difficulty of solution is often increased by insight. It is likely that recognition tests covering content which has been superficially or partly learned will show almost as many "errors" for gifted as for dull students though any thoughtful observation will show that the former are more learned both in facts and in understanding.

Adequate and excellent learning may result in excluding, ignoring, or minimizing details which were essential to earlier and less adequate performance. Typically, good drivers give minimum attention to details important to the trainee. Such exclusions and reductions may look like error but they constitute gain since they remove non-functional clutter. Among gifted learners, the rapid elimination of nonessentials should not be confused with forgetting.

Under suitable conditions gifted learners do not repeat errors though they may introduce new ones. Those who consistently turn in perfect work are being deprived of a suitable education.

7. *Review for gifted children should be "new view."* Teachers recognize that for duller students each idea must be often repeated and carefully rooted in a previous one. Therefore, a curriculum for dull children is very limited, very highly selected, practical, and worth learning exactly. Review is mostly repetition. Gifted students climb more easily from generalization to generalization. For gifted subjects, review should be characterized by a "different" look. Suppose a unit in the social studies has been designed around a trip by train from Chicago to Denver, the review might well consider some of the learn-

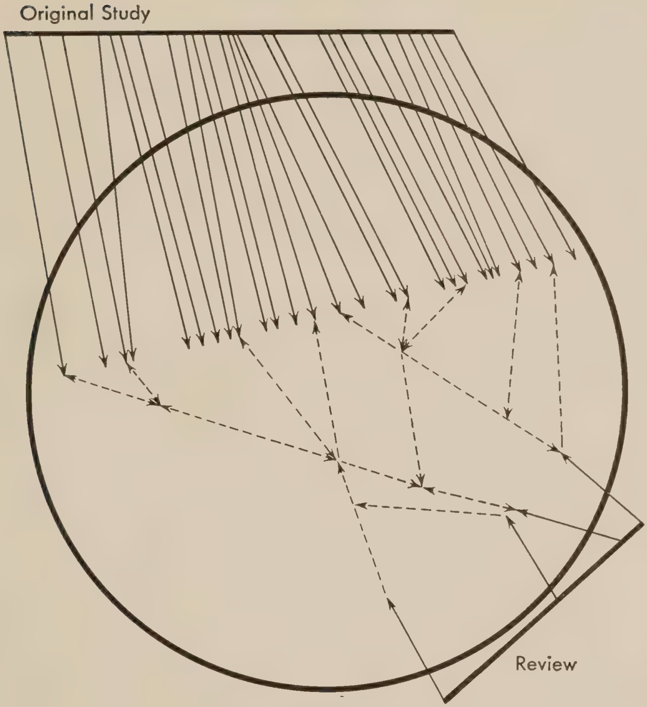

Figure 7.

Schematic Plan for Review, Covering New Material, and Adding to the Amount or Depth of Understanding

ings as they would appear from "riding the rods" or from an airplane.

With gifted children, it is especially appropriate to assume that understanding develops progressively. As suggested in Figure 7, review provides another look at the topic from a different point of reference. The fixing or firming of learning is accomplished through increased understanding or more adequate perception. Facts are remembered in relationship to each other or because they have implications. In this way original insights are related to new insights and are thereby elongated or enlarged. If the insight is comparatively complete, learning is comparatively permanent. Permanence in learning is encouraged by more adequate understanding rather than more frequent repetition.

In summary so far

High-order learning frequently begins with massiveness and lack of clarity and works toward finer discriminations and greater detail. The first perception is total but simple. This initial sparseness of information motivates the learner to find supporting facts or judge new data against the hypothesis or first guess. Learning moves toward more defensible conclusions or hypotheses not simply by accumulating facts but by accepting or discarding, by appraising and judging, or by organizing and summarizing.

Instruction for such learning is largely a matter of arranging experiences in which altering and judging are produced. The lesson or demonstration organized to give all of the details or all of the conclusions may not be appropriate. If the learner is to rearrange, discover, and try the almost-work solutions, the lesson must leave problems as well as answers. Less able students require exact repetitions and teacher-organized conclusions in larger measure than the gifted. Superficially, it may seem that exploratory and discovery learning rule out the lecture but this is not the case. The lecture-discussion approach, when skillfully employed, provides for both economy of activity and high level motivation with the added advantages of adaptation to a range of abilities and in-process adaptations to the learning of the students. The routine fact-giving lecture plays a small part in suitable education for the gifted but the well-conceived lecture provides for an active intellectual experience on the part of the student and may be very appropriate, especially at the high school level and above.

Gifted learning demonstrates relatively large dependence on a "leap-and-check" system in which errors are introduced and then eliminated because they do not fit the total perception, the whole skill or the complete hypothesis. The effects of learning are observed in the quality of judgment and not just in the amount of knowledge. The value—appropriateness, exactness, and permanence—of this learning lies in the students' ability to discriminate exactly, recognize error and draw on a wide range of supporting facts. These qualities are built by exploratory rather than repetitive experience, by alert inquiry more than quiescent attentiveness, and by altering and changing rather than reproducing.

Motivation

Teachers have never escaped a utilitarian concern with motive as an energizer, a selector of goals, a director of behavior and a reinforcing agent for preferred behavior. Clearly, the initial push or urge to activity is vital to learning. Motivation leads to striving for a goal, with the least possible expenditure of time and effort and with the greatest possible improvement in performance. The "set" to learn has often been explained in terms of the satisfaction or annoyance value in activity. The simple *law of effect* or psychological hedonism explanation proposes that satisfying acts are fixated. In this view, punishment, based on the native emotion of fear, inhibits, while reward, based on the motive of ego-maximation, energizes. Oversimplification of this explanation has led to the superficial conclusion that motivation is only a matter of competition, prizes, punishments, and other immediate or external symbols of success or failure.

A large number of gifted children are academic underachievers when underachievement is defined as lower placement on performance scales than on aptitude scales.[17] This tendency to do what is average or common is a persistent and well-known phenomenon and it seems to arise from complex patterns of motivation. The cultural and family patterns are likely to play a significant role in the academic and vocational achievement of the gifted child. Some families are disconcerted by the uniqueness of their child and encourage him to accept interests and goals in which uniqueness is not manifest. In other families, the exploitation of gifted children has interfered with outstanding adult performance.

Terman found that the gifted group who were most successful as adults began to grow away from the C or less successful group in the academic work of the high school. Differential academic success was not the result of one-sided hard work but was closely related to family values and conditions. The A group came from families with stronger educational traditions, had fewer inferiority feelings and more stable personalities during childhood, were interested in more occupations and more regularly employed as adults, were in more cases married and less often divorced and were distinctively more curious and possessed of greater drive to achieve.[18]

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[17] Ruth Strang and Mary F. Noecker, "Motivating and Academically Talented," *The Identification and Education of the Academically Talented Student in the American Secondary School*, National Education Association, 1958, pp. 58–63.

Terman found the gifted group consistently high in intellectual and social interest.[19] A very strong liking for school was expressed by 54.5 per cent of the boys and 70.1 per cent of the girls.[20] Only 1 per cent of the sample positively disliked school and 4 per cent were lukewarm.

Intelligence provides a base for coming to grips with the environment but it does not assure adjustment and success. The gifted underachiever appears to be marked by responses of an asocial kind, by patterns of withdrawal and non-participation. He demonstrates less studiousness, more rejection of discipline, poor familial relationship and more physical disabilities in high school.[21] On the other hand, the scholastically successful gifted child has more socialized behavior with better study habits, more environmental stimulation with many hobbies, and less ego-protective behavior, with greater honesty, integrity, originality, and persistence than average for gifted children.[22]

1. *Competition is not specifically more useful with gifted than with average students.* There is a current tendency to recommend competition for all students but especially for gifted students. Sometimes the issue is disguised by proposing that the child may compete with the task or with himself. However, competition continues to mean emphasis on surpassing someone. It implies attention to personal prestige or aggrandizement, involves securing a reward proportionate to one's contribution rather than a reward equally shared, and implies success based on the recognition or the reward of one's achievement over others. Without these connotations it is not competition.

Advocates of competitive motivation argue its value from examples of business and material gain. They argue that children must be prepared to live in a competitive society. This view may be countered by the fact that we live in an interdependent society in which success depends at least as much on co-operation as on competition. It also appears that some children have little need to compete, others are too fearful to compete, and not all who compete truly make progress. Students may neglect appropriate subjects or participate in less useful activities in order to secure prizes, to be valedictorians, or to achieve a selected grade point. They may concentrate on trivial but popular aspects of a particular course. The student involved in a science competition may bend all his efforts toward making an attractive display and pay little attention to genuine scientific thought or ingenuity. Such pupils become competitors intent on prize-getting and are devoid of social responsibility or self-criticism.

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[18] Terman, *op. cit.*, pp. 349–357.

[19] Lewis M. Terman, *et al.*, *Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. I, Stanford, California, Stanford University Press, 1925, pp. 441–483.

[20] *Ibid.*, pp. 253–287.

[21] Agnes M. Conklin, *Failures of Highly Intelligent Pupils*, TCCU Contribution to Education, No. 729, New York, Bureau of Publications, Teachers College, Columbia University, 1940.

[22] Strang, "Psychology of Gifted Children and Youth," *op. cit.*, pp. 504–505.

The intentional use of vigorous competition is most frequently rejected because there are negative by-products. Losers withdraw from the very activity which competition is supposed to promote.[23] Planned competition may also interfere with the development of social morality. It has been argued that the symbol of victory or prize becomes the value, and false standards are developed.[24] Allied with this argument is the belief that highly competitive situations encourage aggression and hostility. Arthur W. Combs, a well known educational psychologist, agrees that highly competitive activities may promote fear and distrust while hampering the development of responsibility.[25]

Keenly competitive situations encourage a runner to practice faithfully or cause an athlete to endure fatigue in a tug of war or motivate a student to spend hours polishing a table which is to be displayed. They seem effective in tasks which are either simple or already well understood. Competition motivates the person to perfect or to do over and over things which are already partly learned. Competition has been successfully used with memorizing the multiplication tables but not on critical or scientific judgment. Urgent motivations which are tied to fear of failure tend to produce repetition. They fail in precisely the areas which are most important to gifted students.

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[23] R. M. Isenber, "Competition and Cooperation in our Society," *National Elementary Principal,* 36, No. 7, May 1957, pp. 22–26.

[24] Henry A. Davidson, "Competition the Cradle of Anxiety," *Education,* 76, No. 3, November 1955, pp. 162–166.

[25] Arthur W. Combs, "The Myth of Competition," *Childhood Education,* 33, No. 6, February 1957, pp. 264–269.

Flexibility, so essential to creativity, must involve making unique tries. In very competitive situations failure is an imminent danger and the child cannot afford to improvise or try the unusual. He is more likely to do the thing which is known to be correct. Attention focused sharply on rewards or on the dangers of failure is inappropriate to research and exploratory learning. In the very competitive classrooms the truly complex and imaginative outcomes are the first to be eliminated.

The real issue is one of emphasis. Should the school stress prizes, ranking, and competition with gifted students more than with average students? Experimental evidence suggests that gifted children profit comparatively less from competition. In 1925, Hurlock demonstrated that reasonable praise or self-evaluation stood high among the incentives for academic learning even for average students.[26] Later she extended these findings in a study of rivalry from which she concluded that competition most improved the work of younger and less gifted children. The Hurlock findings are supported by a study of two groups of boys, one with IQs of 125–130 and the other with IQs of 100–105.[27] In the latter investigation the normal group responded most intensively to the stimulus of competition while the gifted tended to be inhibited by the group except in the accuracy of their performance.

German studies in which Moede used dynamotor tests and memorization tasks show that 93 per cent of poor performers improved under competition, whereas only 51 per cent of good performers became more efficient.[28] Naturally, the greatest improvement is possible for those who start from the lowest base, but not all of the difference can be explained in this fashion. Moede found that the ablest children dropped in efficiency when they were paired with inferior rather than with equal rivals. This phenomenon is fairly well known. Competition seems to work best in groups with a limited range of ability. The inhibiting effects are least when the rewards are fairly evenly distributed in the group.[29] The use of competition in well-matched groups appears less destructive to both individual egos and group cohesiveness than equally intensive competition in less evenly matched groups. Moede's results must be interpreted with awareness that the studies examine only simple mental and motor processes which are least disrupted by intensive competition, whether the simplicity of the process comes from maturity level or from previous learning. Planned competition is likely to be least effective with gifted students who have few rivals and in tasks which are challenging, original, and complex.

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[26] E. B. Hurlock, "An Evaluation of Certain Incentives Used in School Work," *Journal of Educational Psychology*, 16, No. 3, March 1925, pp. 145–149.

[27] C. A. Anderson, "An Experimental Study of Social Facilitation as Affected by Intelligence," *American Journal of Sociology*, 34, No. 5, March 1929, pp. 874–881.

[28] J. Vaugh and C. M. Diserens, "The Experimental Psychology of Competition," *Journal of Experimental Education*, 7, No. 1, September 1938, pp. 76–97.

The value of grades and simple competition may readily be overestimated. These are artificial motivations, and that quality is likely to be perceived by gifted students. The young child strives for a star or for immediate praise but the higher the level of his intellectual development the longer he is willing to wait for his reward. The long-range goals are comparatively unaffected by competition in its usual forms.

It has been proposed that subtle and prolonged forms of competition have greater efficiency with gifted children. There is limited evidence on this point. Ausubel found comparatively varied response to prestige motivation but did not find that these motivations could be counted on to produce significantly better performance in the long run.[30] Ausubel's study was an elaborate one in which he sought to compare prestige with intrinsic motivation. He studied ninety-four children with a minimum IQ of 130 using arithmetic for the experimental tasks. The children thought certain tests were anonymous since the tester told them he wished only to know how fast boys and girls of this age could work. For the prestige tests the children were told that these were speed contests and a list of names and scores would be posted. On the apparently anonymous tests, children quickly reached a plateau and then maintained that level. On the prestige tests, they started at a high point, and then performance declined until the curve nearly met that for the anonymous test. The after effects of either method or the effects which would accrue through a prolonged use of these devices is unknown.

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[29] B. N. Phillips and L. A. D'Amico, "Effects of Cooperation and Competition on the Cohesiveness of Small Face-to-Face Groups," *Journal of Educational Psychology*, 47, No. 2, February 1956, pp. 65–70.

[30] David P. Ausubel, "Prestige Motivation of Gifted Children," *Genetic Psychology Monographs*, 43, 1st half, February 1951, pp. 53–117.

Some schoolmen have expressed enthusiasm for planned competition in the specialized subjects such as music, athletics, or agriculture and to a lesser degree in the simpler and memorized subjects such as spelling or rapid calculation.[31] A common educational view is that a balance should be sought with competition more favored in specifically defined skills or academic outcomes but rejected in the development of personality and social development.[32] Recently there have been more articles advocating that competitive motivation should be used in complex subject matter. Several of these articles naively hold that competition may be more readily and more effectively used with gifted children.

Highly competent work is more readily noted in competitive settings than in co-operative settings but this should not lead to the belief that competitiveness accounts for the quality of work. The highly competitive learner entertains psychological tensions which fix attention on clearly perceived outcomes, narrow his range of attention, reduce intellectual permeability, and limit the interchange from area to area in his intellectual system. We may conclude that competition cannot be effectively used in larger amounts for judgmental learning or for gifted students.

2. *Identifications and emulation are major motivations among gifted children.* Full consideration of the compelling motivations of social approval, social imitation, and rebellion must remain outside the present treatment but we cannot ignore the relation between these and the drive to learn. Some of the better known studies in industry prove that production motivations arise from personal involvement more than from obvious rewards. While most of the workers work for money the rate or the quality of their work is more changed by changes in human relations than by increased pay.

Gifted children like all others, learn many things which they do not recognize and cannot explain. Most important, they learn from other people's behavior some estimate of their own value and some opinion of others. This valuing of self and valuing of others is very important in learning. The student who respects and accepts himself and also accepts others uses fewer evaluative words and more co-operative pronouns such as "we" or "our," is more realistic and participates more readily than other students. The student who accepts other people but blames or doubts himself behaves quite differently. He is less prone to blame circumstances for his difficulties, uses more "my" and "mine" pronouns, uses more "think" and "feel" verbs, uses fewer "act" verbs, keeps more to himself, and tends to be preoccupied with accuracy.[33] Obviously, two students with identical intelligence levels but different estimates of themselves will specialize in different subjects, have different goals, and achieve different standards.

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[31] J. Dolph, "Lessons of Athletic and Musical Competition," *Music Journal*, 16, No. 3, March 1958, p. 40.

[32] Anthony C. Riccio and Herman J. Peters, "Needed: Cooperation and Competition in the School Program," *Phi Delta Kappan*, 40, No. 2, November 1958, pp. 97–99.

The self-concept is vital in everything the child does. Spelling has been improved through altering the self-concept and there is a body of evidence to indicate that reading functions can be greatly improved in a like manner.[34] The choice of behavior and, therefore, motivation arises from the way the student sees the world and sees himself. It seems unlikely that efforts to motivate will be successful unless individual self-perceptions are well understood.

Perceptions have amazing permanence because each new experience is interpreted in terms of the old. Early judgments were made in situations which involved personal needs and values and they persist in subsequent learning. The individual learns in order to maintain and enhance, or at least to be consistent with his early self-acceptance. Politics, history, religion, and day-to-day observations demonstrate the "consistence" in our own point of view and the "obstinance" in the other fellow's. We share the same facts but our conclusions diverge in remarkably the same fashion as they did in the beginning. These perceptions are comparatively impermeable to fact and are changed only as they are learned in prolonged, non-threatening human interactions.

The early years are vitally important in developing interests, willingness to try, trust, self-dependence and other attitudes, which play a major part in all subsequent learning. When Nancy and Kathy were very small they began making decisions. By the time Nancy was two years, ten months she chose to wear a party dress to the hospital because, "The operation will make me feel bad and I'll want something to cheer me up." Because this independent role was accepted, both children continued to make decisions of increasing difficulty easily and effectively. They do not fear making decisions. They expect acceptance but they know that other people decide things too, and they are not self-punitive when they find themselves in error or in disagreement. They move openly into relationships with teachers and with other students. Thereby, they secure superior learning relationships along with a reputation for friendly good judgment. Out of such early identifications and self-values they have derived self-confidence, independence, and enthusiasm as rather permanent aspects of their motivations.

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[33] Robert E. Bills, "About People and Teaching," *Bulletin of the Bureau of School Service*, 28, No. 2, Lexington, College of Education, University of Kentucky, December 1955, pp. 14–29.

[34] Arthur W. Combs, "Seeing is Behaving," *Educational Leadership*, 16, No. 1, October 1958, pp. 21–26.

In the regular classroom, the teacher alone is mature enough to recognize which ideas are important to a gifted member of the class. Only by identifying with the teacher may the child secure approval that encourages learning or thinking. This does not imply that the teacher need unduly praise the efforts of gifted children. Honest evaluation, including kindly criticism is more genuinely motivating than fulsome praise for it proves that the idea of the work is worthy of attention. Understanding the child's ideas requires more teacher-effort than does unqualified praise. It will be recognized as respect for competence and is highly motivating.

3. *Unending variety and newness of experience alone do not provide for an education in originality, creativity, or critical thought.* It is sometimes suggested that out-of-ordinary situations are the source of problem-solving responses. This is only partly true. Often, the most convenient and appropriate response in an involved or frustrating situation is to notice that person who moves most easily and most certainly and then to follow his leadership. Challenge and variety may increase the need to identify with strength and may increase dependence rather than individuality and critical thought.

Should the newness of the experience and the severity of the challenge become inappropriately great, all possibility for adaptation and creativity is lost. The overpowering need for self-preservation does not assist in securing an intelligent reaction from horses caught in a stable fire. Instead of adapting through flight they seek to preserve the security which they have known in their stall and so they burn to death. The airplane pilot, when the task becomes too difficult, "freezes" at the controls and dooms himself. Experimental evidence with rats shows that fear inhibits intellectual function in much the same fashion as decortication by surgery or drugs. In animals and in humans, fear induced by tasks too far above competence causes *repetitive, non-adaptive* behavior at an *extreme* rate, either slow or fast.[35] An educational plan for gifted children cannot be built by merely assuring challenge and variety. Unwisely arranged or paced, these characteristics cause stereotyped dependence and personal destruction.

4. *Adequately chosen learning situations are motivating to gifted students.* Many lists of motivations include such items as "mastery," "owning," and "controlling." Usually these motives are thought to be derived from such basic needs and such early learning as to be fundamental and intrinsic to the more obvious motivations. One way of mastering, of owning, or of controlling is to "make sensible," to understand, or to place in a controllable or intelligent arrangement. Each of us tries to solve the riddle of things that impinge upon us and we live uncomfortably with things which are not understood, or which are strange, mysterious, or unfathomed. Philosophers, poets, artists, explorers, and scientists demonstrate man's need to discover and understand.

The natural search for simpler and more complete explanations, the attempt to organize perceptions, and the desire to find relationships or fit observations into some unified system are primary motivations in learning. We may assume that:

1. Curiosity is a powerful motive in the gifted.
2. The capacity to know stimulates the need to know. More goals are attainable for the gifted and a wider range of interests is characteristic for them.
3. Purposes and goals are more readily perceived by able students, thereby reducing the need for extrinsic motivations.
4. Superior persons are most able to judge their own performance.

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[35] H. Rudolph Schaffer, "Behavior Under Stress: A Neurophysiological Hypothesis," *The Psychological Review*, 61, No. 5, September 1954, pp. 323–333.

They are likely to recognize the shallow spots in their learning. Consequently, they are self-motivated to remove any ineptness that interferes with satisfactions which would accrue from superior performance.

5. *Level of aspiration is closely related to social values and family experience.* Terman and Oden wrote that "no other factor so strikingly differentiates" fairly successful and very successful gifted subjects as does the factor of "family background." [36] Family and group expectations apparently influence both the selection of goals and success of gifted children. The most successful or A group differed from the C group in the following: twice as many of their fathers were college graduates, their fathers were in professions on a three-to-two proportion, their parents participated in home instruction in more than one-and-a-half times as many cases and their siblings were twice as often college graduates.

Family values may underlie many of the social class differences that seem to exist. Gifted children are found in the upper middle class in proportionately large numbers. Such children come from families which are concerned with success and achievement and these middle-class values find sympathy in the American teacher who tends to be from the same or slightly lower social class. The pressure to achieve is accompanied by values that encourage self-improvement, willingness to defer satisfaction, less sexual or socially aggressive behavior, concern for property rights, and other characteristics that fit easily into the school pattern. Academic motivations are less effective with lower-class children and it is probable that many of these perform so poorly that their superior ability is never noted.

It is also commonly observed that girls do well in elementary and junior high school but are less interested in senior high school and college. Some of this change may follow from changes in subject matter but some surely comes from the fact that advanced education is not perceived as vital in furthering the purposes and goals of the maturing female learner.

The self-perception of the gifted child comes early because he recognizes the role expectations which surround him. He identifies with adults and interprets experience. He learns his values and patterns his goals more after the home than other children do. The school is only one of the motivating agencies. Academic interests or artistic interests may be much higher in one school than in another, not because the schools differ but because the communities differ. In some periods of history, able children are encouraged to be philosophers, in other periods, soldiers. In our own time they are probably most encouraged to be scientists or advertising and business men. We attribute to nature many interests that are learned like the mother tongue.

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[36] Lewis M. Terman and Melita Oden, "Correlates of Adult Achievement in the California Gifted Group," Chapter III, *39th Yearbook of the NSSE, Part I, Intelligence: It's Nature and Nurture* (Guy Montrose Whipple, Ed.), Bloomington, Illinois, Public School Publishing Company, 1940, p. 80.

Later we shall review the consequence of some of these factors on college attendance. However, the same factors affect the whole life and all of the child's functions. Performance on an intelligence test itself is related to drive and family attitudes toward intellectual tasks.

One is apt to assume that every gifted child should proceed through college and take a higher degree. This is obviously debatable. The evidence is inadequate to assume that there is a direct relationship between the level of happiness and the level of education. At most, further education assures the average child greater economic competence but there are exceptions even in this. In short, very great enthusiasm for formal education may come in conflict with the individual's right to a free choice. Even the social argument for advanced education is not totally consistent for it may be very desirable to have a number of truly creative and inventive people in farming, retailing, and the trades. Should all gifted children continue to higher degrees, it would greatly limit the probability of their entrance into such occupations. Those who have responsibility for helping children select goals need to use a great deal of caution and wisdom.

Goal-setting also reflects personality. Secure and confident students choose realistic goals but anxious and dissatisfied students select goals that are determined by unrealistic ambition or by despondent submission to failure. Studies show that criticism, poor marks, or failures are least damaging to assured and secure personalities.[37] When grades of "poor" are autocratically assigned, secure students make short-term improvement but less secure students falter and perform less adequately. The famous study of Pauline Sears shows that successful students are most realistic in self-estimates and least influenced by recently preceding failures.[38] These and many other studies indicate that parents and teachers can assist gifted children in developing consistent and realistic standards for themselves. In order to do so there must be a preference for individualized rather than for group standards. Otherwise, social pressures cause students to avoid wide divergence from middle-good performance which, in itself, does not challenge them.

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[37] George C. Thompson and C. W. Hunnicutt, "Effects of Repeated Praise or Blame on the Work Achievement of Introverts and Extroverts," *Journal of Educational Psychology*, 35, No. 5, May 1944, pp. 257–266.

Standards sometimes imply expectations that include punishment for underachievement. Standards with this implied involvement may be particularly inappropriate to gifted children. It is probable that blame and anxiety are increasingly destructive as the being or the task becomes more complex. First, anxiety is more pervasive and more permanent in man than in lower orders of life. Punishment, which may simply extinguish inappropriate behavior in the rat, when used with children develops anxiety that spreads to other activities and interferes with motivations. Second, the severity of punishment, effective in increasing learning, decreases as the task becomes more difficult or as it requires finer discriminations. The Yerkes-Dodson principle establishes that the optimum intensity of punishment is inverse to task difficulty.[39] These and other studies support the general contention that punishment is inhibitory and non-creative and particularly inappropriate in teaching complex skills or materials dependent on higher mental processes and these appear to be materials most suitable to highly intelligent children.

Should gifted students be expected to learn mostly from their own mistakes? A totally positive answer might lead to drastic and even lethal situations, but a partially positive answer is indicated. One learns from the consequences of behavior providing that the error is noted and understood and if a more adequate or successful behavior is then tried. Error provides a minimal punishment but success provides a comparatively greater reward. It has often been noted that punishment may fix rather than reduce the undesirable behavior unless some more desirable response is available or suggested. Punishment, in terms of seeing errors or enjoying less than complete satisfaction with one's own performance, has in it elements of partial reinforcement and is, therefore, conducive to permanence in learning.[40] Self-criticism is characteristic of gifted children and the mild punishments that arise from self-evaluation encourage adaptation rather than withdrawal.

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[38] Pauline S. Sears, "Levels of Aspiration in Academically Successful and Unsuccessful Children," *Journal of Abnormal and Social Psychology*, 35, No. 4, October 1940, pp. 498–536.

[39] R. M. Yerkes and J. D. Dodson, "The Relation of Strength of Stimulus to Rapidity of Habit Formation," *Journal of Comparative Neurology and Psychology*, 18, 1908, pp. 459–582.

Common observation should prove that highly involved persons do not observe, do not discriminate, and do not learn. Their vigorous needs may interfere with learning. The need to avoid small electric shocks causes children to overestimate the size of cards with which the shock was paired even though they were able to judge the size of other cards.[41] Urgent, driving needs are most likely to interfere with long-range and complex goals. Competitive "goal-blindedness" discourages self-evaluation, encourages the perseverance of error, and limits discovery.

Motivation is highly personalized and any device which causes a long-run reduction of status or self-respect will reduce learning. The student's comfort, his permanence and his stability depend on knowing the environment. Therefore, natural curiosity and significant subject matter combine to motivate the gifted student.

Transfer

Schools exist on the assumption that transfer exists, that the learning may be used at other times and in other situations. To assure the usefulness of education some have advocated a curriculum of many specifics. This is a "fill'er up" view which contends that the gifted person should know enough to meet a wide variety of situations. Others have advocated a tough mental discipline, apparently assuming that this provides a kind of personal readiness for adult toughness. Then there have been advocates of learning principles which become guides for organizing new facts at a later time. This view is often closely related to the view that learning how to learn is the crux of the matter. Probably, a majority of teachers advocate emphasis on learning, problem-solving, and critical thinking in subject matter which illustrates generalizations or principles.

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[40] L. G. Humphreys, "The Effect of Random Alternation of Reinforcement on the Acquisition and Extinction of Conditional Eyelid Reaction," *Journal of Experimental Psychology*, 25, No. 2, August 1939, pp. 141–158.

[41] J. S. Bruner and L. Postman, "Tension and Tension Release as Organizing Factors in Perception," *Journal of Personality*, 15, 1947, pp. 300–308.

As early as 1924, Thorndike reported on a study of more than eight thousand pupils that no mental discipline value was found in any subject.[42] From this first study and from a later study with five thousand students, Thorndike concluded that good thinkers were more interested in certain of the school subjects, and observers erred in assuming that these particular subjects developed the student's thinking or judging ability. He proposed that similar gains would accrue to gifted people despite the subject matter. The more intelligent subjects, and particularly boys, were found to gain most from a study of the natural sciences but we may assume that these children found science contributed to their life plans. This motivated them and they learned effectively and transferred their learning readily.

There followed a period of disillusion with mental discipline and mind-training. This period coincided with excited materialism and utilitarianism in the schools during which content was selected for practicality and immediate usefulness. This led to a fragmentation of curriculum with every course designed to fit a near-to-life situation. With the consequent proliferation of disjointed and sometimes over-specialized courses there was a lack of philosophy or unity in the educational experience. The curriculum was inadequate and discouraging for gifted students and it became clear that above average rather than truly gifted students had become the academic achievers.

This very specific and vocationalized education appealed to a society motivated by economic interests and characterized by industrial growth. It continued long after other experimenters concluded that transfer was largely by generalization or because the learner saw the principle or the rule. The best known of these experiments was performed by Judd who found that the accuracy of shooting darts at submerged stones was more effectively increased when explanation and practice were combined than when practice was used alone.[43]

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[42] E. L. Thorndike, "Mental Discipline in High School Studies," *Journal of Educational Psychology*, 15, No. 1, January 1924, pp. 1–22, 28–42.

[43] Charles H. Judd, "The Relation of Special Training to General Intelligence," *Educational Review*, 36, June 1908, pp. 28–42.

Such evidence brought a trend toward interpreting transfer as a matter of reorganizing or discovering the constant (abstract) in the variable (concrete). This trend continued with educators becoming advocates of "meaningful" learning, "learning how to learn," or "reference model learning." This was largely a return to interest in higher mental processes.

Thorndike had found that the upper 1 per cent of students transferred almost fourteen times as much to a final test as did the bottom 1 per cent. However, there was also negative transfer. Other experimenters found that the generalizing ability of gifted children caused them to spell phonetically and make some errors not made by dull children.[44] Boners result from such transfer. They are likely to occur with gifted students when they operate hastily or in somewhat automatic fashion.

The general rules of teaching for transfer apply to education designed for gifted subjects. Though a lesson may be longer and may be offered in less rigid order we may, for instance, expect to find gifted children learn most at the beginning or at the end. This is known as the "serial position effect" and is found among all learners.[45] Least adequate learning is at the middle or just past the mid-unit and, therefore, transfer is facilitated through careful introduction of each problem and through providing opportunities for summing up. Though the gifted learn easily the ordinary rules for good teaching may not be abandoned.

Positive transfer must be encouraged. It is facilitated when the learner has facts which are in themselves important and are well understood. A suitable curriculum assures a wide reference field but it assures that the facts or ideas which have been stressed are truly significant. In each subject matter area there is a need for expert and thoughtful selection of key concepts. When these are learned insightfully, maximum transfer can be anticipated.

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[44] H. A. Carroll, "Generalization of Bright and Dull Children—A Comparative Study with Special Reference to Spelling," *Journal of Educational Psychology*, 21, No. 7, October 1930, pp. 489–499.

[45] Carl I. Hovland, "Experimental Studies in Rote-Learning Theory: III, Distribution of Practice with Varying Speeds of Syllable Presentation," *Journal of Experimental Psychology*, 23, No. 2, August 1938, pp. 172–190.

Evaluation

Parents, teachers and students share the common tasks of evaluation. They seek evidence of learning and growth or note failures and inadequacies. Gifted children are especially capable of self-evaluation. Adults are, of course, involved in estimating status as part of the process in selection of curriculum and methods.

Objectives in education for the gifted differ both in difficulty and kind. Therefore, evaluation also differs. Tests should be characterized by:

1. Items that require generalization to novel situations not considered in the previous instruction.
2. Limited use of recognition and memory items other than those which have long-run usefulness.
3. Items that require organizing, following through a sequence or rearrangement.
4. Items that require judgment of relationships, conclusions, or evaluation.
5. Items that require rapid silent reading or other learning techniques.
6. Emphasis on individual learning rather than teacher or textbook organization of content.
7. Use of analogy items, critical judgment, or other higher process materials.

Educational outcomes most peculiarly characteristic of gifted learning are least effectively measured by textbookish class tests. Such tests are usually filled with items of mid-difficulty; the solutions may be perceived or content may be known by a majority of students. They do not require superior deductions, conclusions, and insightful organization. Furthermore, because these tests are necessary in measuring minima or detecting inadequacy, they require skills, rote repetitions, or the recognition of items restated from teacher or text. While gifted students can perform with this kind of material it does not provide any real measure of their learning.

The most accurate and valid information is not likely to be secured through routine end-of-unit testing. Gifted students can all too readily meet the demand of a uniform test. They may learn to study for limited goals characteristic of tests patterned on the textbook. They may become experts in cram techniques because their confidence delays the panic which so severely limits the ordinary student on that hectic night before testing. Observation and discussion on a continued basis must be added to ordinary testing in order to secure valid or extensive data. Day-to-day evaluation is susceptible to lack of standardization and incomparability from time to time or child to child, but it is most likely to be adapted to individual differences.

The second grade teacher appraises reading comprehension in the regular class period. She may ask the less able child, "Bill, what was the name of the boy in our story?" The question for Mary may be, "How many children were in the story?" Joe's question is, "Where did the children find the secret?" The question for Nancy is, "Why does finding the secret make the children feel happier?" These questions become increasingly difficult with "who," "what," and "where" questions suited to most of the class, but the more demanding "how" and "why" reserved for those who share Nancy's capacity to perceive, infer, interrelate, and organize. Skilled teachers adapt teaching to ability level and they appraise reading comprehension or other learning from day to day. Evaluation by discussion motivates each child to examine the quality of his own work. The limited child is asked what was said, how many, or other questions that seek repetition. His friend, who is more gifted, is asked to summarize or elaborate. The most gifted child may be asked to rearrange or to extend new conclusions.

Evaluation patterns are implicitly determined by instructional goals and procedures. Education that builds stores of simple memories is likely to "measure knowledge by bulk, as it lies in the rude block, without symmetry, without design." [46] Education suited to gifted children seeks depth and thoroughness. It cannot be appraised by simple recall, repetition and reproduction of isolated bits of information. This appraisal must be based on performance that requires not only the recall of *A*, *B*, and *C*, but requires the recognition of interrelations between *A*, *B*, and *C* and the change in relations that result with change in one of these. Measurement is characterized by attention to relationship, application, and interpretation; it is focused on much understanding before many facts.

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[46] John Henry Newman, *The Idea of a University*, New York, Longmans, Green and Co., Inc., 1947, p. 194.

Structuring

Intellectual capacity or intelligence is a major factor in the determination of method and content. Teaching is largely a matter of so arranging and structuring experiences that the student may learn from them. The student must participate, must handle, arrange, discover, and reorganize. Much of the experimenting and rearranging is at a symbolic or thought level. It involves little movement or observable activity. Good teaching always causes the student to invest energy in the task. No one truly invests in tasks so complex that they are incomprehensible or so simple they are vapid. Successful teaching arranges problems at appropriate levels according to individual abilities to comprehend and solve them.

Only rash and uninformed opinion can deny the significance of the readiness concept. The crudest observation of children demonstrates that some are ready to learn earlier than others. Their physical co-ordination, eye growth, personality development, social background, or some other difference makes them peculiarly ready. The central problem of teaching is to adapt to this complex set of individual differences or readinesses. We should find it easier to explain our feelings about marriage to an adult who has himself experienced some of these feelings, to one from our own culture, of our own sex, of our own religion, and of our own social class. In short, the more common our understandings and our experiences, the more readily we can structure the material. In the school, adequate structuring is most possible, not for the teacher who is most like the pupil, but for the teacher who best knows or best understands the pupil—his physical limitations, his misconceptions, his learning acuity, his experiences, and his feelings.

The teacher arranges a situation in which the pupil can learn. For the very dull child the juxtaposition of facts must be very simple and so arranged that the solution is readily discoverable. The juxtaposition appropriate for the very able student is more involved and requires the student to make longer leaps or to formulate hypotheses which are less clearly indicated. Intelligence is one of the major, if not *the* major, factor in determining which are appropriate situational arrangements and it is surprising that many educators have been inclined to neglect intelligence in considering individual differences. There has been a feeling that it is not "quite right" or democratic to be aware of intellectual differences because they are so permanent. Nevertheless, intelligence variations are so important that they may not be ignored. Emotional maturity, social class, physical size, and other differences are vital in structuring and teaching but intellectual ability or degree of understanding continues to be a major determiner of what to teach, how fast to teach, and what method to use.

Some teachers atomize the intended learnings and present them in an explicit, detailed, and orderly fashion. Such teaching is admired for its orderliness and for outcomes which seem exact and precise. The learning is often rigid, always limited, and usually uncreative. In a weight-lifting class the stronger members can easily lift the load which is maximum for the weakest member. However, the instructor does not assign this load to each one because it would not be effective in increasing individual capacities. Somewhat analogously, gifted students are handicapped when intellectual activities do not require the intellectual leaps or intelligent solutions for which they are fitted.

The step-by-step process is admired by many academically-minded critics of education who unknowingly advocate a subject-matter education rather than an education in thought and judgment. It is true that horizontal intellectual growth is probably unlimited. It is unlikely that any person should live long enough to learn all the things of which he is capable. He continues to learn almost unendingly but none of the learnings are beyond his level of complexity. His learning ladder is horizontal more than vertical. For example, it may be possible to teach history at the college level as a series of facts no more complex, though more numerous, than the facts of high school or elementary school history. In such a case, those who can learn historical facts in elementary school can continue to absorb more and more history, but only facts without implication. Some of the students may learn to state certain implications if teachers continue to order these inferences in easy arrangements.

The principle seems simple enough but it is frequently misunderstood. The gifted child draws on associated facts, organizes ideas, and generalizes or implies. Therefore, he does much structuring for himself and the most appropriate lesson is marked by less rigidity, less teacher direction, and less repetition. The dull child approaches problems with few of the materials of thought. Because he cannot draw readily on either facts or insight, the lesson is structured in greater detail, in closer relation to the previous lesson, with more repetition, and with more concrete illustration. The teacher of the gifted must structure also, but the structuring occurs at more remote levels and in larger frames of reference.

In order to learn thinking and judgment, the gifted child must think and judge. He must have an opportunity to organize for himself and must be encouraged to reorganize at each point in his learning.

One of the more obvious failures in teaching intelligent children occurs in the natural sciences. Frequently, a course is thought to be intellectual because it includes laboratory practice even though the laboratory processes are rigidly prescribed allowing for little inventiveness or scientific thought. Under such conditions, gifted students are as prone as others to copy laboratory books and to perform the required processes by rote. These students must learn laboratory techniques which are appropriate to their vocational, cultural, and social life but it seems obtuse to insist that every experiment must be performed or that no principle may be understood through reading without laboratory work. Actual contact and physical handling should not be thoughtlessly removed from learning activities nor should they be retained when they inhibit invention and thought.

Over and over again we find audio-visual and learning aids mentioned as vital in programs for the gifted. While such devices are extremely valuable in all education they are most essential for the less able. The gifted have greater capacity to visualize or verbalize and smaller need to handle or manipulate. Models, field trips, films, and other learning aids serve a somewhat different function for gifted than for average children. They serve less to reinforce the lesson or class material than to enrich through supplementing and providing concomitant insights. Few commercial aids are specifically designed for the gifted and the available ones may be expected to serve more marginal purposes. These aids are proportionately less significant and the library more significant in the education of gifted children.

This conclusion should not eliminate the use of instruments and aids which are interesting to gifted children or which add to their store of extraneous information.

Good teaching is a complex task because the classroom contains almost numberless variables. Among the most important of these variables are differences in learning rate. When Pete is admitted to Elm Road he should be expected to develop quickly and smoothly for he has a store of facts and habits of thought. Good teachers will not handicap Pete or some other small boy by insisting that all shall learn the same things at the same level of complexity. They will not insist that Pete must count blocks when he conceptualizes without blocks—though the other children may need to handle and count. Nor will these teachers assume that tasks are good for Pete simply because they are difficult or uncongenial. They know that students learn from both unpleasant and pleasant situations, that learning occurs when the student finds a solution or solves a problem. Excellent teachers arrange experiences so that some of the students using short-step methods and dependence on rote and memory will arrive at solutions while other students with long-step methods and creative transfer arrive at more complex and more mature solutions. These teachers see the student as an active learner, seeking to control his world through understanding and making better sense. The teacher attempts to arrange experiences so that the student may find his way.

9

Administrative Arrangements for Bright Children

Should Stephen be moved to a special high school? Should Pete be accelerated by early school entrance? Were Kathy and Nancy handicapped by their experience in a multigrade classroom? Answers to these questions require an examination of current and historical practice in treatment of the bright.

Historical perspective

History sheds confused light on the efficiency of various approaches to education of the gifted. Isolated instances of remarkable learning have often been attributed to special methods of parental design. Biographers have not provided essential details concerning the education of famous men, methods are not comparable, and the reports do not cohere enough to demonstrate principles. Insights drawn from the lives of men such as John Stuart Mill or Karl Witte are fragmentary and untestable. Those that are drawn from planned or unintentional segregations are likewise sketchy and opinionated. There is every reason to suppose that equally able children might accomplish as well under other conditions.

Organized attempts at special education are very old. Best known is the Plato plan in which those who passed certain tests would be classified in an upper group and would receive training for leadership through the study of science, philosophy, and metaphysics. Plato proposed that the tests used for selection should measure ability to learn by trial and error methods, to recognize superstition and to detect deceit. One colorful program carried into effect was that of

Suleiman the Magnificent. In the sixteenth century, this Ottoman sultan established an orderly and vigorous system of selection. His "scouts" went throughout the Turkish Empire to bring in the fairest, strongest and most intelligent youths of the Christian population. The children were then intensively educated in the Mohammedan faith, in war, science, religion, and art. Under Suleiman and his successors these talented slaves contributed to the development of the powerful Ottoman Empire. This is perhaps the most striking historical instance of effectiveness in training a group of highly intelligent children.

Acute educational problems arose with compulsory attendance. Slow learners were punished, were not promoted, or had adjustment problems. Their cases were first to receive attention through extensive study and through special adaptations. The needs of gifted children were deferred because they were less disrupting in the school and because creative work was thought to be inspired rather than learned. Inventive and creative thought was not considered a function of education, and other powerful forces in social thought opposed special consideration of gifted children. The first of these forces was the vigorous demand for total equality fostered by democratic sentiment. The second was the psychological thought of the day. This psychological bias was characterized by John Locke's concept of mind as a blank tablet ready for the writing of experience or Herbart's concept of mind as an apperceptive mass waiting to be informed by experience. A concept of equal endowment and passive mind was largely accepted from the days of Leibnitz to those of John Watson. Political and psychological thought combined to discount human inequalities and the importance of intellect.

Provision for gifted children in American schools began with efforts to speed up programs for these children. This saving of time was achieved by differential rates of promotion and did not involve methodological or curricular change.[1] In 1868 William Harris, superintendent of St. Louis Public Schools, inaugurated a plan designed to care for both the subnormal and the gifted. Promotion periods were shortened to half-year, quarter, and then five-week sessions. Another early plan was the multiple-track system in Elizabeth, New Jersey.

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[1] Arch O. Heck, *The Education of Exceptional Children*, New York, McGraw-Hill Book Co., Inc., 1953, pp. 377–378.

Pupils were sectioned and allowed to advance at different rates. The Cambridge plan starting in 1891 applied to grades four to nine. One group covered these grades in four years, the other in six. It was also possible to cover the first three grades with one group and the second three with the other. Students might cover the six grades in four, five or six years.

The second period beginning at the turn of the century received considerable impetus from the introduction of intelligence tests. Flexible promotion gave way to acceleration in a broader sense.[2] In 1898 the Santa Barbara plan was initiated. In this program children were divided into three ability groups which were to be taught the bare essentials, a regular course, or an intensive program. In 1900, Batavia, New York, undertook special instruction through the addition of a special teacher in the room with the regular teacher. This special teacher provided individual instruction as needed. In San Francisco the plan was modified so that the gifted children reported individually to special teachers who handled selected projects with them. The Batavia plan was a forerunner of special class arrangements. In 1901, a special school—a preparatory school—was opened at Worcester, Massachusetts. Enrichment and opportunity classes were begun in Los Angeles, Cleveland, Rochester, New York, Oakland, Toledo, and many other cities. In 1930, there were special schools or classes in forty cities in twenty-three states. Nevertheless, they served less than 1 per cent of the 1,500,000 children with IQs over 120.

During these years, Terman and Hollingworth were making extensive contributions to identification techniques and descriptive materials on gifted children. Little other experimentation was in progress and a dearth of proved instructional technique contributed to the abandonment of some special programs.

Current situation

The 1940's brought compelling evidence of the need to conserve human resources and currently there are many programs for the gifted. They tend toward increased segregation or grouping. Typically, in Ottawa, Canada, children had been allowed to take grades three and four in one year and were separated into a fast group in the seventh or eight grade. By 1956, the Ottawa schools had a plan for special classes through all grades wherever schools were large enough.[3] Modern programs tend to develop under the influence of a highly motivated teacher or a school director. They arise in isolation and are often patterned on single or narrow convictions. They adhere somewhat rigidly to one or another of the patterns tried thirty years earlier. Few of them use fundamentally different materials or changed methodology.

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[2] Merle R. Sumption, *Three Hundred Gifted Children*, Yonkers-on-Hudson, World Book Co., 1941, pp. 10–16.

Until 1958 or 1959, there was little legislative attention or statewide promotion of educational plans for the gifted. A few states made special legislative provisions. In some cases authority to support special programs was granted by a separate law, but in most states authority to provide for the gifted is included in legislation designed to serve all exceptional children. An increasing number of states are now making special studies or grants toward improvement of education of the gifted. Early among these was Connecticut where the State Board of Education empowered a special committee to investigate needs, to disseminate knowledge, and to encourage constructive measures in the education of the gifted.[4]

For many years the most common practice in secondary schools has been differentiation of curricula with more competent students choosing "college preparatory" and less able choosing general or clerical courses. Other administrative arrangements for the gifted are less common and less precise than similar provisions for slow learners. In 1954, more than half of the secondary schools had special low ability and remedial sections but only 4 per cent had special rapid sections.[5] A 1950 survey in Ohio showed that about 2 per cent of schools had special classes for students of high ability, 9 per cent provided some enrichment, and 18 per cent made no provision. The remaining 71 per cent "professed interest." Another contemporary survey reports that twenty-seven out of thirty-three responding elementary schools made some adaptation. In these schools enrichment or enrichment in some combination was much more common than segregation.[6]

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[3] *The Vancouver Sun*, March 19, 1956, p. 5.

[4] John Hersey, "Connecticut's Committee for the Gifted," *Educational Leadership*, 13, No. 4, January 1956, pp. 230–231.

[5] Arno Jewett and J. Dan Hull *et al.*, "Teaching Rapid and Slow Learners in High Schools," *Bulletin 1954*, No. 5, Washington, D.C., U.S. Department of Health, Education and Welfare, U.S. Government Printing Office, 1954, pp. 8–9.

While there is a revitalized interest in the education of the gifted it appears that current planning faces many of the problems which were pointed out in 1939 by a national committee on evaluation of education of the gifted. It is still possible to conclude that:

1. Individual programs fail to use general data available from studies of the gifted.
2. Each program has gone in its own direction without evaluating previous educational effort.
3. Programs tend to concentrate on one aspect of education, usually the academic—or sometimes one aspect of the academic.
4. Most adaptations are quantitative, causing gifted students to cover more subject matter rather than different subject matter or the same subject matter by a different method.
5. The programs have been piecemeal with little continuity or transferability from community to community or even from grade to grade in the same community.

The Practices

Essentially, all programs are enrichment programs. They are designed to provide for individual work, for differentiated assignments, for greater depth of learning, or for more rapid pace. Each seeks to enrich by providing more or different learning opportunities. For practical purposes such arrangements may be discussed in the categories *grouping, acceleration,* and *enrichment* in the regular classroom.

A. Grouping

Both pitch and volume increase when discussions turn to the question of separating the gifted. The common use of the word *segregation* accentuates the conflict. The semantic problem is partly avoided by using the term *ability grouping* and more vigorously avoided by using the term *congregation.* Advocates of the latter maintain that boys congregate to play baseball, that children congregate to put on a play or to pursue other common interests, so why not have them congregate in the pursuit of intellectual interests and academic learning?

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[6] Paul A. Witty, *The Gifted Child* (Paul A. Witty, Ed.), Boston, D. C. Heath and Co., 1951, pp. 195–197.

The debate involves more than semantics. There are those who feel that grouping helps both the individual and the society. Others maintain that both the individual and the society are injured by any plan which separates one child from another. In 1956, Rear Admiral Rickover, famous for his work in the development of the atomic submarine, proposed a separated education for children above the fourth grade.[7] A few weeks previously, the *Vancouver Sun* took editorial exception to a suggestion for separation made by the Chancellor of McGill University. The *Sun* opposed "hard and fast divisions" and favored "the democratic company of one building." They did not propose to "retard the thinkers" or to "handicap the doers" but they suggested that there are major advantages in the variety of secondary school life as that life is lived in "one company." [8] This argument takes on extra vigor outside professional circles and among those who have not reviewed the data on earlier experiments.

In general, those who propose a very academic education or an education for specialists propose segregation. When efficiency in war, industry or business is seen as the primary goal of education, the method of segregation is preferred. The debate is joined on the other side by those who prize democratic attitudes and good adjustment. This latter group argues that invention and economic success are most achieved in countries which are short in class distinction and societies in which there is a mingling of many abilities.

The viewpoints of teachers tend to be less extreme than are the views held by the general public. Teacher-willingness to consider grouping practice has probably been increased by the expanding student population. Teachers must now work with students who come from an increasingly wide variety of backgrounds, have an increasingly wide range of ability, and hold an increasingly wide range of purposes and vocational ambitions. These conditions combined with a more nearly automatic promotion system greatly increase the range of mental age in the classroom. Grouping seems more practical and more acceptable to teachers because there has been an increased competence in guidance programs, accuracy in educational measurement, and acceptance of the idea that equal educational opportunity cannot be equated with identical education.[9]

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[7] "The Indispensable Men," *Time*, 68, No. 23, December 3, 1956, p. 77.

[8] Editorial, "They Learn Together, Segregating Brighter Pupils Contrary to B. C. Practice," *The Vancouver Sun*, October 2, 1956, p. 4.

Some form of grouping within a class is commonly used and teachers are prepared to accept this as long as it is functional in instruction. Like laymen, teachers prefer democratic procedures but many of them see no contradiction in a limited use of homogeneous grouping. These teachers point out that children develop social consciousness and social usefulness through the identification which occurs in face-to-face relationships or small functional units. They believe that grouping may contribute to democratic development. The chief purpose of grouping continues to be academic and not social or political. The formality of the grouping varies from school to school and from subject to subject. A study in Los Angeles County shows that the larger schools practice grouping more commonly than do smaller schools and that the schools of both sizes practice grouping in required academic subjects more commonly than in elective courses.[10]

Many educators see the special class as a device for selecting and enriching curriculum. It provides opportunity to include extra subject matter and, in some cases, extra subjects. Proponents of special classes contend that a narrowed range of ability produces more adequate teaching, greater depth, more enrichment, more exactly-chosen method, and more time for teachers to provide individual guidance. Laziness and ease may succeed less in the special class and students may expend greater effort, work more effectively, and appraise themselves more accurately. If so, grouping develops better work habits and stronger motivation.

It is often proposed that grouping is bound to occur because the gifted child selects playmates, friends, and companions from among competent peers. A few writers hold that genius is by its nature a rarity and must always isolate the person from the large group. They believe this wistful solitude should be preferable to denial of intellectual self-fulfillment. These writers contend that if there are no living companions of high ability, gifted children would be happiest studying the works of great men of another era.

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[9] Robert N. Bush, Editorial, "Grouping Pupils in Secondary Schools," *California Journal of Secondary Education*, 30, No. 1, January 1955, pp. 2–3.

[10] John Eales, Harold Reed, and Claude Wilson, "Grouping Practices in the Secondary Schools of Los Angeles County," *California Journal of Secondary Education*, 30, No. 1, January 1955, pp. 54–57.

> There is
> one great society alone on earth:
> The noble living and the noble dead.[11]

There can be little doubt that capacity is influenced by experience and ability is fulfilled through challenge. The gifted child, encouraged to explore in any field, soon develops extensive interest and the thinking and learning skills which are valued in that special area. On the other hand it appears that lack of direction leaves the abilities latent. Gifted children unchallenged tend to read widely but not beyond the level of their classmates. They are articulate but shallow. Advocates of the special class hope to provide content which calls out the conceptualizing and critical qualities of gifted learners.

Some people suppose that lack of challenge results in psychological underdevelopment and may also result in inadequacy of a neural kind. Recent evidence gives some support to the belief that fundamental neurological changes do result from learning.[12] Repeated electrical activity in the brain may produce cellular or metabolic changes in the brain. The development of "trace" or "synaptic knobs" presumably may facilitate subsequent intellectual operations. It has sometimes been assumed not only that each cell activity leaves a mark or trace in the brain, but that use causes growth and idleness causes atrophy and waste.[13] Such ideas are only speculative but should it be shown that early learning influences neurological ability, it would emphasize the need to challenge the gifted. Without neurological findings there are adequate psychological evidences of the need for challenge.

Teachers who oppose special classes argue that homogeneous grouping places emphasis too rigidly on the mastery of subject matter and neglects the social-emotional development of the child.[14] They fear that segregation will develop a selfish sense of superiority and fail to develop understanding or skills which are involved in the leadership of a democratic society. They believe that unselected schools prepare children for democratic life and reflect the co-operation and personal relatedness necessary in a sound adult society.

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[11] Nathaniel D. Mittron Hirsch, *Genius and Creative Intelligence*, Cambridge, Mass., Sci-Art Publishers, 1931, p. 327.

[12] D. O. Hebb, *The Organization of Behavior; A Neuropsychological Theory*, New York, John Wiley and Sons, 1949, pp. 62–66.

[13] J. Z. Young, *Doubt and Certainty in Science, A Biologist's Reflections on the Brain*, London, Oxford University Press, 1956, pp. 34–39, pp. 83–86.

The "one-class" argument contends that ability grouping deprives the less able student of the excellent examples and stimulating ideas which might be contributed by those who are removed from his classroom. It is also argued that current testing methods are inadequate to selection and that unfairness will result. Less commonly, it is said that special classes may cause the gifted to overcompete and overwork and may increase the cost of instruction.

There is no simple answer to the question of whether or not to segregate. Non-promotion was abandoned because it did not produce homogeneity but it did produce unfavorable secondary effects. At the present time, the public greatly overestimates the changes that should follow from ability grouping. No plan can be expected to do away with individual differences and make classroom instruction a simple matter. In an average first grade, the achievement range is between three and four years and in an average sixth grade this range has increased to seven or eight years. Studies show that the division of a grade into two ability groups will reduce the range in any one group by 15 to 17 per cent.[15] These reductions may seem disappointingly small but their effects should not be underestimated since many teaching problems arise with the child who is extremely different from the group.

Evaluation of practices is difficult because many authors describe programs which they have designed or in which they have been taught. The reports are descriptive and short on objective data. This literature has a mirage quality with numerous programs existing only in the literature having been altered or abandoned in practice.[16] In broad perspective, special attention to the gifted is much more common now than it was a decade ago.[17] In this revival it appears that segregation plans have enjoyed considerable favor.

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[14] Virginia C. Brown, "The Problem of Grouping in the Social Studies: A Junior High School Teacher's Viewpoint," *California Journal of Secondary Education*, 30, No. 1, January 1955, pp. 42–45.

[15] J. Wayne Wrightstone, *Class Organization for Instruction*, Washington, D.C., National Education Association, 1957, pp. 4–14.

[16] A. F. Isaacs, "How to Use the Mirage Literature on the Gifted Found in Educational Periodicals," *Educational Administration and Supervision*, 42, No. 5, May 1956, pp. 288–291.

There is no unanimous professional agreement with this trend. Experienced junior high school principals in New York City disagreed among themselves, with forty-six supporting a grouping program and twenty-eight favoring its abolishment.[18] The proponents saw advantages in the greater stimulation, keener competition, development of leadership qualities and the time-savings, while opponents cited disappointment suffered by pupils not admitted, peer-rejection of those who were admitted, snobbery and hostility which developed, overemphasis on academic attainment, and attention to acceleration rather than to enrichment. New York teachers were slightly more favorable toward segregation than were the principals, with 65 per cent of the teachers in favor and 29 per cent disapproving.[19] Teachers who taught special classes were most favorable, and the objections of teachers were similar to those of the principals.

A follow-up of graduates of the Cleveland system was reported in 1941.[20] The investigator matched three groups of former students who were then approximately twenty-one years of age on such items as sex, age, intelligence, and childhood social status. The children in the first group were controls who had not attended special classes. The second group had attended special classes for comparatively short periods and the third group had attended for more than four years. For the most part, the conclusions favor the special class. Students who had attended these classes had superior academic records. Compared with the controls, they read more serious books, were leaders in more organizations and as freqeuntly practiced good health habits. They failed, however, to express keen interest in the welfare of others and this may indicate a serious hazard of separation. This negative finding has resulted in a recommendation that, where segregation is practiced, integration should be achieved through closer association in student affairs and on the playground.

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[17] Lillie Lewin Bowman, "Educational Opportunities for Gifted Children in California," *California Journal of Educational Research*, No. 6, 1955, pp. 195–199.

[18] Joseph Justman and J. Wayne Wrightstone, "The Opinions of Junior-High-School Principals Concerning the Organization of Special Classes for Gifted Children," *Educational Administration and Supervision*, 37, No. 7, November 1951, pp. 396–404.

[19] Joseph Justman, "Obstacles to the Improvement of Teaching in Classes for the Gifted," *Exceptional Children*, 18, No. 2, November 1951, pp. 41–44.

[20] Sumption, *op. cit.*

A study in Detroit also found that academic progress was greater in segregated classes. The students held more positions of leadership and were less frequently referred for help with emotional problems.[21] Despite a few contradictory findings it may be concluded that ability-grouping produces slightly greater academic learning. The evidence also indicates that grouping is relatively more effective with the dull than with the average and relatively more effective with the average than with the gifted. While some of this differential may be an artifact of statistics, it is not possible to say that grouping will benefit the gifted in the same proportion that it will benefit the dull.

Although opinions are generally favorable there is no total satisfaction among students who have participated in special classes. In 1955, graduates of the Cleveland Major Work program were asked to evaluate their experiences. From a 77 per cent return on the questionnaire it was found that 47 per cent approved enthusiastically and 37 per cent approved with reservations. The respondents appreciated the opportunity to express individuality and to study special subjects but they were concerned over the lack of social contacts and over the attitudes of both teachers and students.[22] A California study reports more uniformly favorable opinion on the part of both parents and students.[23] Greater ambivalence is shown in a slightly earlier study of 190 children in fourth, fifth, and sixth grades in New York City.[24] In this study children were asked five questions relating to the homogeneous groups in their own schools. These questions were designed to reveal feelings toward the other group and to find in which group the child would prefer placement. Most of the more gifted children wished to be in Group 1, although some said they would earn better grades and get by more easily in a homogeneous group. Duller children said they would be put back anyway and expressed a general feeling of inferiority and ostracism. Both groups of children said that their parents wanted them in the gifted group. All children recognized the basis for grouping and were sensitive to the social implications involved in the separation.

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[21] A. Harry Passow, "Enrichment of Education for the Gifted," *Education for the Gifted, The 57th Yearbook of the NSSE, Part II* (Nelson B. Henry, Ed.) Chicago, University of Chicago Press, 1958, p. 209.

[22] Walter B. Barbe, "Evaluation of Special Classes for Gifted Children," *Exceptional Children*, 22, No. 2, November 1955, pp. 60–62.

[23] Ruth Martin, *An Experimental Program for Gifted Children in the Intermediate Grades*, Seminar Study, Berkeley, University of California, 1955, pp. 99–100.

[24] Abraham S. Luchins and Edith H. Luchins, "Children's Attitudes Toward Homogeneous Groupings," *Journal of Genetic Psychology*, 72, March 1948, pp. 3–9.

Student opinionnaires are susceptible to distorted interpretation and are often overvalued. The problem is demonstrated by a recent newspaper report which shows that thirty-two out of 137 students in a special program did not desire to continue after the first year.[25] Although 56 per cent of the students wanted to continue, the report is entitled "Bright Students Plan Turns Sour." It should not be concluded that a program is unwise because 23 per cent of the children view it unfavorably. It is also presumptuous to say the program is good because 56 per cent, or any other percentage, favor it. Most of the teachers and the parents approved the program in question. The children who objected to this separation blamed loss of playtime, separation from their friends, and too much homework. A child's feeling toward his educational program or an adult's appraisal of childhood experience may provide valuable hunches for improvement of a program but do not constitute an adequate evaluation of that program.

Grouping serves as an expedient device in attacking the problem of individual instruction, especially in academic subjects and in the large secondary school.[26] It contains elements of provision by default. If teachers were skilled enough, classes small enough, programs flexible enough, and materials good enough, it might be unnecessary and even undesirable. These conditions do not prevail and segregation may be practical.

In any case grouping must be viewed as a complex problem. Any group selected will be marked by more heterogeneity than homogeneity. Children of one mental age will vary in size and chronological age; those who are nearly homogeneous in reading will differ in mathematics, in art, and in athletics. The problem is to select a group which will make it possible to adapt instruction and curriculum to the student. The degree to which grouping is desirable and the organizational pattern for grouping must be determined carefully. That decision calls for sound pedagogy and a sense of responsibility for all children.

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[25] "Bright Students Plan Turns Sour," *The Vancouver Sun*, December 5, 1956, p. 32.

[26] Delwyn G. Schubert, "A Reading Specialist Considers the Grouping Problem," *California Journal of Secondary Education*, 30, No. 1, January 1955, pp. 29–32.

Teachers are aware that a student may be idle in the heterogeneous arithmetic class but fully challenged in the heterogeneous drama or social studies class. Following these observations there is a tendency to favor fluid grouping on a functional basis. It is common to congregate or bring students together for special subject or activity needs. This approach is difficult from an administrative point of view but assures better placement and avoids some of the social problems. Many teachers favor "cluster-grouping," limiting range but not seeking very exact homogeneity on a single characteristic. A child with high normal intelligence and outstanding achievement may be in the special group while a low achiever with slightly greater ability will not. In this pattern a class may include abilities from the low to average range or from the average to high range but will not contain low and high. The proponents of this method think that it retains the greatest number of virtues.

In short, there is a trend toward more grouping in the schools but the classifications are broader, less rigid, and less permanent than those formerly used. The range in each group is comparatively large and the individual may participate in more than one group. In each case he is assigned because that group provides the greatest learning opportunities. The placements are made in terms of activity and last as long as appropriate, rather than throughout a school career. A partial categorization of approaches is presented below.

Special school

The first special school was organized in 1901. Very few have been organized since that time and most are found in the larger cities. Such schools provide for maximum development of academic skill and for sensitive vocational planning. Among the better-known examples is Hunter College Elementary School in New York. This is a nursery, kindergarten, and elementary school connected with Hunter College. The children are selected on a competitive basis with a minimum Binet IQ score of 130. It is an experimental school and there is an attempt to limit the size of classes and to balance the sexes within the classes. The curriculum is based on that for New York City schools but extensively enriched.

New York also provides the best examples of specialized high schools. Approximately one-quarter of the high schools could be listed as specialized in some way. Typical of these is the Bronx High School of Science. Students are admitted on a selective basis; they intend to go to college and have a special interest in mathematics and science. They come from any economic level and participate in an enriched curriculum where science is taught with a good deal of laboratory work, where a mathematics sequence of four years is available and where the remainder of a full program is provided. Enrichment is both within the classes and in extra-class activities.

Special class

The special class is the most commonly used formal segregation arrangement for education of the gifted. Nevertheless, only fifteen of 3,203 cities reporting in 1948 had such classes.[27] It should be noted that enduring programs have often used this device. Typical of those with a record for endurance is one in Saskatoon, Saskatchewan, or the Cleveland Major Work groups. Most special classes use the same subject-matter classifications as those used in the regular program but differentiate in the depth of examination and the range of supporting activities.

Differentiated program

The differentiated program or multiple-track plan is a very old and very common one. Students are not put in special classes except where these classes are required as a part of the program leading to a particular diploma. Certain of the students take a college entrance program, others take a technical program or a commercial program. The programs are variously described and sometimes are referred to as honors programs.

Core and special classes

Arguments against homogeneous grouping are sometimes met by having all students take certain courses together and some students take special classes. This plan is not unlike the elective system. The elective classes often become special classes designed for students who are distinguished either by their intelligence or their work habits in that subject.

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[27] Lewis Terman and Melita Oden, "The Stanford Studies of the Gifted," *The Gifted Child, op. cit.*, pp. 34–41.

Released time

The released-time approach has usually been coupled with a system of seminars. The assumption is that able students can accomplish generally required tasks in an abbreviated time. Such students are dismissed for special activities. An example of this is contained in a report from Sewanhaka High School in New York. Pupils with IQs above 120 were released to follow their special interests.[28] These students explored topics which would not be part of the general program, and had an opportunity to work with various members of the faculty. Various schools have seminars in the areas of mathematics, English, or science.

Not all of the seminars are confined to schools. The Dallas Public Library has organized a program for talented children. While this program is encouraged by the school it is held in the public library with two classes of elementary and one class of high school students. These children meet after school hours in the pursuit of literature and creative-writing experiences.[29] A program of this kind was tried at Ohio State University. In this case the seminar was designed to provide a time-saving for those who were most capable. The students covered the same subject matter as the class in general and they took the final test with the class, but they were allowed to accomplish the work in shorter order and then to take another class or participate in extra activities.[30]

In-class grouping

Skilled teachers at various levels, but especially at the elementary level, group children within classes. The most common example of this is in the elementary reading class where teachers vary the rate of progress and the difficulty of material though the children remain in the same classroom and participate in many common learning experiences.

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[28] Asenath M. Mosso, "A Seminar for Superior High School Seniors," *School Review*, 53, No. 8, October 1945, pp. 464–470.

[29] Robert J. Havighurst, Eugene Stivers, and Robert F. DeHaan, *A Survey of the Education of Gifted Children*, Chicago, University of Chicago Press, 1955, p. 96.

[30] Barry T. Jensen, "An Independent-Study Laboratory Using Self-Scoring Tests," *Journal of Educational Research*, 43, October 1949, pp. 134–137.

Hobby and club plans

Enrichment has been sought through the development of many extra-class activities. It is difficult to distinguish some of these from the previously mentioned seminars or honor classes. Most activities are of a rather academic nature. This approach was most vigorously presented in 1931 by Osburn and Rohan. The authors were strongly motivated against the "wait-quietly-until-all-have-finished" point of view.[31] They hoped to avoid the extensive waste of time induced by compulsory physical attendance. They proposed to use the interests of gifted children in widespread exploratory experience. They argued that in-line acceleration was unjust and they borrowed from the ideas then popular in the Dalton plan, the project method, the unit, and the contract approach. They favored hobby and club programs and described in considerable detail the organization and outcome of clubs interested in salesmanship, teaching, writing, forestry, museums, dancing, and like activities. They noted a "tendency to marked activity" as the second most fundamental characteristic of genius.[32] Their program has been widely acceptable in a society which is convinced that a strong mind must be active in the pursuit of either good or evil. Many of their ideas have been combined with other special attempts at enrichment and the hobby or club approach is part of most organized programs.

B. Acceleration

Acceleration is a method for grouping. It has been proposed as a practical rather than an ideal device. Early advocates proposed acceleration for both time-savings and motivation. It was estimated that gifted students waste approximately half their time in the school day.[33] Acceleration was suggested to reduce loafing and disinterest. Acceleration began with the *short promotion* period and with *skip-*

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[31] W. J. Osburn and Ben J. Rohan, *Enriching the Curriculum for Gifted Children*, New York, The Macmillan Co., 1931, p. 3.

[32] *Ibid.*, p. 35.

[33] Henry Herbert Goddard, *School Training of Gifted Children*, Yonkers-on-Hudson, World Book Co., 1928, p. 33.

ping. Other approaches have involved *telescoping work, participation in extra experience,* and *early school entrance.* Rapid progress adaptations have saved student time, have been easy to administer, have been comparatively inexpensive, and have not required differentiation of the curriculum. Though economy and simplicity are arguments of considerable appeal there was strong opposition to acceleration at mid-century.

A survey by a national group found only 15 per cent of junior and senior high school principals favored any shortening of the high school program.[34] These data reaffirm the vigorous position taken by high school personnel during World War II when they opposed the recommendation of the Educational Policies Commission and felt that acceleration in college entrance would be a kind of baby-snatching.[35] They refused to participate in plans which would encourage able students to leave high school one year early and to receive both a high school diploma and credit for their freshman program at the end of the first college year. They maintained that high schools provide better guidance, better social opportunities, and better emotional environment. Similarly, vigorous rejection was voiced by the National Association of Secondary School Principals in 1951 when they opposed the Ford Foundation plan for early admission to college.[36]

These organized reactions to acceleration plans are consistent with other evidence indicating that the chronological lock-step became more rigid during the second quarter of the century. At the end of the first quarter, Terman found that 84.9 per cent of the elementary gifted group had skipped at least one half grade and that 4 per cent had repeated at least one half grade. More girls than boys were accelerated but the likelihood that individual girls were accelerated as much as three semesters was slightly less. The extent of the acceleration may be noted from Table 10 which gives the mean age at graduation from the eighth grade, from high school and from college.

[34] Krueger *et al.*, "Administrative Problems in Educating Gifted Children," *The Gifted Child*, *op. cit.*, p. 260.

[35] Sidney L. Pressey, *Educational Acceleration, Appraisals and Basic Problems*, Columbus, Ohio, Ohio State University, 1949, p. 19; and E. R. Van Kleeck, "If Colleges Start Cradle Snatching," *Nations Schools*, 31, No. 1, January 1943, p. 32.

[36] Morris Meister, "What are Some Promising Programs for Gifted Students?" (Summary of Presentation) Proceedings of the 38th Annual Convention, National Association of Secondary Principals, *The Bulletin of the National Association of Secondary Principals*, 38, No. 202, April 1954.

Table 10

Age at which Gifted Subjects Graduated
(after Terman)

Graduated from	*Mean* *Boys*	*Girls*
8th Grade	13.10	12.10
High School	16.10	16.80
College	20.90	20.50

Source: Lewis M. Terman *et al., The Promise of Youth, Follow-up Studies of a Thousand Gifted Children,* 1930, p. 83, and *The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group,* 1947, p. 269, *Genetic Studies of Genius,* Vols. III and IV, Stanford, California, Stanford University Press.

We may assume that accelerations were adjustments to intelligence, for Terman also found a significant correlation between the degree of acceleration and the childhood IQ. Those who were most accelerated most commonly graduated from college, more often did graduate work, made more *B* or better grades in college and received more graduate honors. They more frequently became business and professional men and were more than twice as frequently judged to be in the *A* group when rated on vocational success. There is some evidence that a very few highly accelerated boys may have incurred more than usual high school problems. The evidence does not hold for the girls and even for the boys it is so small as to be inconclusive. Marital and adult adjustments do not support the conclusion that boys were seriously hampered by any of the problems which they met in high school.

Terman became an advocate of acceleration. He urged that students with IQs of 135 should be ready for college by seventeen years at the latest.[37] His data are most convincing when we take account of the fact that even in a period when acceleration was popular, students in the Stanford group were accelerated by only 14 per cent though their average mastery of school subjects was advanced by more than 40 per cent.[38] The Stanford data also contra-indicate the conclusion that subject-matter competence is closely connected to the time spent in study of the subject. Terman found little relationship between achievement in academic matters and the number of years or months which the student had spent in school.[39] He recognized that willingness to accelerate or not to accelerate was largely determined by the relative weight placed on academic and social values. Though there is little evidence that maladjustments develop from acceleration, one of the common objections is that "the child will be a misfit."

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[37] Lewis M. Terman *et al., The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group, Genetic Studies of Genius,* Vol. IV, Stanford, California, Stanford University Press, 1947, p. 281.

[38] Lewis M. Terman *et al., The Promise of Youth, Follow-up Studies of a Thousand Gifted Children, Genetic Studies of Genius,* Vol. III, Stanford, California, Stanford University Press, 1930, p. 473.

Other studies of the results of acceleration have led almost unanimously to the conclusion that some acceleration should be practiced. The affirmative argument is old and consistent. In 1888, President Eliot of Harvard voiced concern because the age of admission to various professions had been rising steadily for sixty years. He was concerned because professional people were not able to support themselves until they were near twenty-seven years of age and they were entering on careers at a point too late for their own satisfaction and too late for the betterment of society. A study of almost six thousand Harvard undergraduates, from 1902 to 1912 inclusive, shows that the younger students had better academic records, received more honors, and participated in fewer disciplinary actions.[40] A similar study covering twenty years at Dartmouth shows that those who entered at age sixteen or less received two and a half times as many honors as did their older colleagues. Other studies at Minnesota, Columbia, Barnard, Northwestern, The College of the City of New York, and Pennsylvania colleges lean with amazing consistency toward the single conclusion that students entering college early are superior in academic performance, and continue their superiority.

Those who oppose acceleration point out that students entering college in accelerated fashion are those of greater ability and consequently should not be compared to the student body in general. This objection has been countered by a number of studies which show that equally able students perform better when accelerated. Several studies have compared accelerated students with non-accelerated students. The students were matched in sex, percentile intelligence-ranking, size of high school attended, position in high school class and other factors. The younger students usually equaled older ones in average college marks and in percentage graduating with distinction. They excelled in mathematics and language competency.

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[39] Terman *et al.*, *The Gifted Child Grows Up*, *op. cit.*, p. 280.

[40] Pressey, *op. cit.*, pp. 5–6.

Opposition to acceleration is often voiced on the basis that accelerated students are denied social experience and suffer emotional maladjustment. There is little evidence in support of such contentions. Accelerates at Barnard and Columbia were more active and more successful in athletic and non-athletic extracurricular activities than were other students. A variety of studies show that young college students are elected to student office, invited to join fraternities, and are generally active in the extension of their program.

Informed judgment on the merits and demerits of rapid promotion require acquaintance with the volume entitled *Educational Acceleration* by Sidney L. Pressey of Ohio State University.[41] Further information on the effects of acceleration is accruing through the Program for Early Admission to College. This program, sponsored by the fund for the Advancement of Education, provides for early college entrance for highly endowed students.[42] In the fall of 1951, 420 selected students entered eleven participating institutions. With few exceptions these students were under sixteen and a half years of age and the majority had completed only the tenth or eleventh grade. Another group were admitted with advanced standing thereby shortening the college program. Comparative study of these groups should provide valuable evidence on the effects of accelerated college experience.

It is to be expected that the evidence now being accumulated will support and extend the conclusions of the Pressey Studies. At Ohio State, students graduating at ages below twenty-one had higher mean point-hour grade ratios and had grades of *B* or better three times as commonly as students four years their senior. Though younger students were more commonly working for their own support and participated in more activities, they did not feel pressed and did not suffer in health as the result of their college load.[43] Accelerated college women required very much less medical attention and felt that they would be able to carry heavier loads six times as frequently as those who entered college at nineteen years or more. The younger group also enjoyed summer sessions though the older group were favorably inclined toward a summer of rest.

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[41] *Ibid.*, pp. 1–148.

[42] Fund for the Advancement of Education, *Bridging the Gap Between School and College,* Evaluation Report No. 1, June 1953, pp. 55–108.

[43] Pressey, *op. cit.*, pp. 62–63.

Since accelerated students enjoyed college and extracurricular activities, it is not surprising to find that they remained in college to complete their degrees. In the Ohio sample there was a steady decline from 70 per cent of completions for those entering at sixteen years, to 67 per cent at seventeen, 56 per cent at eighteen, 45 per cent at nineteen, 58 per cent at twenty, and 53 per cent over twenty. Obviously, some of the accelerated students did not do well but those over the 80th percentile were outstandingly successful.

When graduated, the accelerated students earned slightly less than their colleagues during the first years but they earned more when they reached comparative ages. There is evidence of their continuing social and vocational success. Accelerates in teacher-training more often received bachelor of science degrees, were more often appointed to administrative positions, were more frequently rated *B* or better by their superiors and received higher salaries.

College studies alone are convincing on the values of acceleration but studies from other levels are in strong agreement. Accelerated elementary pupils perform more adequately when they reach high school, more often go to college, receive more honors, participate in student activities, and have success in their vocations. In Brookline, Massachusetts, children admitted up to nine months younger than the ordinary admission age were very successful.[44] Follow-ups indicate that the children were academically superior and physically indistinguishable from the older group by the end of the first year. They were less frequently referred to school officials for emotional, social and personal maladjustment. Similar evidence comes from Lincoln and Lancaster counties in Nebraska where early entrants maintained excellent adjustment and generally performed above grade-level expectations in both social and academic tasks.[45]

Advocates of early school entrance argue that this method has special advantages. The child is placed in kindergarten or in the first grade with those who are more nearly his mental equals; he is, therefore, less likely to develop bad study and work habits. He not only saves a year of his life for professional preparation or for work in his chosen field but he works at a more adequate rate throughout his school program.

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[44] James R. Hobson, "Mental Age as a Workable Criterion for School Admission," *Elementary School Journal*, 48, No. 6, February 1948, pp. 312–321.

[45] D. A. Worcester, *The Education of Children of Above-Average Mentality*, Lincoln, University of Nebraska Press, 1956, pp. 17–19.

There is a common tendency to discount evidence of success for early entrants on the basis that, had these younger pupils entered school a year later, they would have performed at even higher levels. A study of 4,275 pupils in Nebraska tends to deny this contention.[46] Early entrants were found to be superior in every quality rated or measured. They were higher in achievement, health, co-ordination, acceptance by others, leadership, attitudes toward school, and emotional development. These data seem unequivocal. A young child mentally ready for school is probably better served by early entrance. There is no evidence that he will be better adjusted if he is required to wait and join the group when his mental age is well beyond that of the other members of the class.

A most compelling social argument in favor of acceleration is that it permits the gifted individual to enter his life's work early and thus to fill a desperate need for high ability in our national and industrial life. All who do educational planning for these children should be acquainted with a fascinating study by Harvey C. Lehman entitled *Age and Achievement*.[47] His conclusions may be overdrawn because he worked from limited criteria and did not account for changing conditions which affect recognition. Nevertheless, the data are striking, simple evidence of how early in life maximum creativity is reached in the sciences, literature, art, athletics, the army, philosophy, medicine, music, and leadership.

In field after field, the finest work has been accomplished by men who started early and accomplished while they were still comparatively young. Typically, in the sciences the best work is accomplished between the ages of twenty-five and thirty-five and only rarely after forty. Equally important, the high productivity period for work of a lesser kind is characteristically five or ten years later. Exceptions are found in matters of social leadership and other major areas where the accumulation of knowledge plays an important role, but the general conclusion is that superior creativity develops rapidly to a maximum in the thirties and it is very unlikely that an extension of life span would greatly increase the proficiency and productivity of most creative men. It appears desirable that gifted individuals should be prepared to make their contribution early. It has been estimated that a saving of one year for 1 per cent of the children in the elementary and secondary schools would produce 250,000 man years of quality service to society.[48] It appears, also, that these man years would be at an appropriate and productive time of life.

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[46] *Ibid.*, pp. 21–27.

[47] Harvey C. Lehman, *Age and Achievement*, Princeton, Princeton University Press, 1953.

Objection to acceleration is commonly centered on the social-intellectual and physical-intellectual discrepancies which are presumed to exist among gifted children. Other arguments are based on the assumption that rapid progress denies the student concomitant social and emotional experiences and encourages rote learning. Neither of these arguments is supported by scientific data which show that discrepancies are much smaller than commonly imagined. Gifted children are usually advanced in total development and are successful when accelerated. Terman was aware of the negative attitude toward acceleration in public education and in some of his last writings he tried to break the lock-step tradition.[49] He reiterated findings which favor acceleration. Many of the findings are related to social and emotional happiness but some are related to academic progress. There is very little evidence to show that time measures in education are closely related to competence and to learning and there is no reason to believe that full-term school experience necessarily increases either productivity or happiness.

Some of the most vigorous arguments in favor of acceleration are built around the proposition that school progress should be determined totally by mastery of the subject matter and not by hours spent in class. Proponents of this view contend that a child will find his most stimulating and satisfying environment when he is placed with his intellectual peers regardless of age.[50] The proportions of this proposal are ordinarily ignored by these enthusiasts. Such a proposal must be examined in the light of the fact that twelve-year-old school girls may be expected to range in mental age from nine to eighteen years. Equally immense differences in ability exist at every level in the educational system.

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[48] A. Harry Passow, *et al.*, "Planning for Talented Youth," *Considerations for Public Schools*, New York, Bureau of Publications, Teacher's College, Columbia University, 1955, p. 48.

[49] Lewis M. Terman, "The Discovery and Encouragement of Exceptional Talent," *The American Psychologist*, 9, No. 6, June 1954, p. 226.

A Pennsylvania comparison of high school seniors with college students provides startling evidence of the range found in academic ability.[51] Students were examined on a twelve-hour battery covering English, mathematics, science, history, and the arts. The examination was designed to cover essentials of a liberal college education. It was found that 10 per cent of 1,503 high school seniors exceeded the college senior average and, further, that 14 per cent of high school seniors surpassed the average for twenty-one-year-old college senior men. It is unreasonable to propose that grade placement should be entirely determined by academic ability.

It is scarcely necessary to insist that acceleration is an individual matter taking into account the total welfare of the student. It helps to overcome the faults of a chronological system which combines classes overextended in intellectual range. Research findings show positive outcomes from acceleration and seem to argue for much greater differentials in rate of progress through the schools.

Advocates of acceleration have valued mental age as the first criterion for placement because mental age more nearly correlates with achievement than IQ or chronological age or IQ and chronological age taken together. Suitable placement must consider not only the rate as shown by IQ but the point of development as shown in mental age. In a study of third grade children in Edmonton, Clarke found that grouping by a reading score reduced achievement variability more than grouping by IQ alone.[52] Grouping by achievement alone is also faulty; it reduces range but does not bring together children of similar intellectual level who will benefit from a particular kind of instruction. The measure which most approximates data on both rate and point of development is mental age and this score combined with a reading score has been frequently ranked high among criteria for acceleration.

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[50] Herbert A. Carroll, *Genius in the Making*, New York, McGraw-Hill Book Co., Inc., 1940, p. 222.

[51] W. S. Learned and Ben D. Wood, "The Student and His Knowledge," *Carnegie Foundation for the Advancement of Teaching, Bulletin*, No. 29, New York, Carnegie Corporation for the Advancement of Teaching, 1938, pp. 21–278.

[52] S. C. T. Clarke, "The Effect of Grouping on Variability in Achievement at the Grade III Level," *The Alberta Journal of Educational Research*, 4, No. 3, September 1958, pp. 162–171.

Acceleration on a single measure is faulty and imprudent. Pete is gifted, academically well prepared for school, eager, large, physically effective and able to enjoy social experience with older children. There is nothing to contra-indicate early admittance in his case. Nancy and Kathy are large, academically skilled, socially mature, and have had the advantage of experience in a multigrade classroom. They read beyond their grade levels and they have all the mathematical concepts taught in the next grade. Their growth should be facilitated by acceleration now, so that they will enjoy superior placement over a long part of their school life. Even "skipping" is for them superior to in-line progress through the grades.

It is more difficult to judge the value of acceleration for Stephen. He is poised on the edge of another growth spurt. Judging from family history, he will probably grow rapidly and mature as a tall man but it is difficult to predict his physical development in the next two or three years. He is academically superior but because he has had six and one-half years of "one grade in a room—everyone promoted" education his special learnings have been channeled only by individual and family interests. He is, therefore, immensely well informed but not uniformly prepared for advanced work. He is less able to profit from acceleration now than he would have been five or six years ago. He has been closed off from abler students and he has succumbed to the limited purposes set by seventh graders. Acceleration by skipping might provide only momentary challenge. If he should be accelerated, the devices necessary to assure accomplishment are much more complex and cumbersome than those which are necessary to the other children.

Acceleration which simply moves a child to a different place in a regular class does not provide adequate education for the gifted. In fact, rapid promotions may be damaging in cases where students skip important sequences in a "beads-on-a-string" curriculum. Otherwise, it is difficult to see why the opposition toward minimum acceleration has been so adamant. Perhaps social forces are the most important deterrent. Modern fathers buy sweaters in college colors for their young sons. These may be dated with the year '81 or '82 and the child is confidently expected to be on schedule. Such chronology should scarcely be expected to determine the level of difficulty at which these children should study in 1967 or 1978. These age prescriptions are devoid of adjustment to individual differences.

A folklore of "right ages" gives support to the assumption that anyone out of step is endangered. Able students repeat materials and mark time because institutionalization very often dominates educational planning. Pressey, the long-term student of this question, advocates a re-examination of the issues.[53] Programs using "primary pools," "rapid progress sections," and "multiple-track" plans have been very successful. The various approaches need to be studied.

Formal

The methods for formal acceleration are skipping, credit by examination, and short-term promotion. Skipping has usually been proposed to avoid dawdling and boredom but it is open to the objection that it parts the child from his friends and that it leaves gaps in his learning. Short-term promotions were used in the early attempts to serve gifted children but have not been popular in recent years. Credit by examination has been used chiefly at the college level and has often been confined to lower division or general education requirements.

Formal with catch-up lab—Rapid Progress Class

This plan is essentially a variation of skipping and special class arrangements. The student is moved through the regular grade system until his ability is distinctly advanced beyond his age mates. He is then put in a special class for one year. This is often an ungraded room. From this class he is moved into a grade two years advanced from his last regular classroom. This method has been used in New York City with telescoping of the work in grades seven and eight.[54]

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[53] S. L. Pressey, "That Most Misunderstood Concept Acceleration," *School and Society*, 79, No. 2027, February 20, 1954, pp. 59–60.

[54] Gertrude Hildreth and Sidney L. Pressey, "Strengths and Weaknesses of Accelerating the Academically Talented," *The Identification and Education of the Academically Talented Student in the American Secondary School*, Washington, D.C., National Education Association, 1958, pp. 73–78.

It avoids the gaps which develop in skipping but must be viewed as interim segregation or grouping.

The contract plan

This plan provides for extra work for agreed credit or special grade. It is essentially derived from the Winnetka or the Dalton Plan.[55] It emphasizes individual instruction and permits the student to move at his own rate once he has mastered the essentials of the curriculum. There are many variations of this approach and they are very much like club and hobby plans. In some cases they approach the "dismiss-when-through" plan. The dismissals are usually arranged so one may help with serving the school lunch or the schoolboy patrol. When the variations become a mere addition of busy work, they fail to serve the original purpose.

Early school entrance, including college entrance

School people have insisted on a minimum entrance age to insure that children would be ready to participate in reading. Since reading is a very difficult intellectual task this minimum age is probably wise for the majority of students. It seems, however, that the opposition to early school entrance is largely emotional. It is a misconception to believe that grouping by age somehow does not constitute segregation and it is impossible to deny that grouping is a fundamental part of school practice. The real issue is whether the group entering kindergarten or first grade should be homogeneous in age and size or should be homogeneous in ability to read. Many of the critics of education have insisted that the primary function of the school is intellectual and if that is true the homogeneity of mental age is more significant than the homogeneity of choronological age.

Variation in academic load

This approach tends to be used mostly in higher education. It is perhaps appropriate in secondary school. There is extensive evidence that gifted students can carry an extra load and are stimulated by it.

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[55] Carroll, *op. cit.*, p. 220.

Reduction in class time

Under this arrangement students attend regular classes but are excused on certain days or for a portion of the time to pursue some enriching activity.

The ungraded room

It has been previously suggested that Nancy and Kathy may well have profited from their beginning experience in a small school with more than one grade per room. Guidance workers who deal with gifted children must deplore the passing of the one-room school for it was a natural adjustment for the gifted. In this environment the able child worked on the basic skills and memoriter content with his own grademates, but in the exploratory and the intellectual pursuits, he ranged forward with the oldest pupil in the classroom. He often contributed to discussions which were organized for children several grades ahead of him.

Some returns to extended age groups are being made and at the present time, the ungraded primary is comparatively common. Many of these also use a contract or unit plan with some children, covering nine or twelve units in three years while others cover twelve or fifteen.[56]

C. Enrichment

It is, perhaps, improper to consider enrichment as if it were a special plan. Clearly, all of the adjustments are for the purpose of enrichment. Consequently, enrichment is often limited to mean "enrichment in the regular classroom." Enrichment often follows the "ahead-sideways" plan for it is essentially an increase in breadth. Proponents of such enrichment argue that variety and exploration are more important to the gifted than are precision and intensive work. The other concept of enrichment is enrichment in depth. This intepretation is more often favored by those who emphasize the academic purposes of education. In most cases reference to enrichment may include some reconciliation of these two points of view.

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[56] Bellevue Public Schools, *Bellevue's Continuous Growth Program, A Preliminary Report*, Bellevue, Washington, Bellevue Public Schools, May 1958, 211 pages.

Enrichment without acceleration has been favored by most administrators and by most teachers. Perhaps this endorsement was merely an avoidance of plans that require segregation or acceleration. Obviously, the great danger is that enrichment activities will degenerate into busy work. Worcester points out that enrichment is rarely encountered when no special arrangements or special classes are involved. He indicates that formalized programs like the Cleveland Major Work Classes or the Independent Study Plan at Modesto have been successful in providing enrichment.[57] In the latter program a group of gifted high school seniors have a daily two-hour session with a special instructor. This provides the opportunity to go faster, further and deeper or to move out and explore another field. It seems likely that enrichments which are not organized may exist only in the rationalization of those who describe them.

There is some need to establish guiding principles for those who would enrich education. Should the elementary and secondary schools lay a broad foundation through widely divergent experience, thereby creating familiarity with many human problems and a wealth of human knowledge? Should they seek enrichment through breadth on the assumption that the first twelve years of education are not years of specialization? Some writers on this subject would enrich through developing very specific knowledge and very accurate skills even though this would narrow the curriculum. They propose that the keen interests of gifted students should be allowed to manifest themselves and that feelings of expertness should be developed. Those who hold this position stress the characteristically early manifestation of specialization which has been found in the lives of most geniuses.

In the regular classroom enrichment involves allowing the child to work at his own speed and at his own level of understanding. This involves the use of more difficult books and often entails explorations that get somewhat afield from the general topic being studied by the class. Some teachers provide for enrichment by in-class grouping.[58] It should be noted that this is essentially an ability-grouping approach though it is accomplished in the confines of a single room. The most common approaches to enrichment include the following.

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[57] Worcester, *op. cit.*, pp. 40–43.

[58] Norma E. Cutts and Nicholas Moseley, *Bright Children*, New York, G. P. Putnam's Sons, 1953, p. 76.

Special assignments

Some special assignments may be part of the general class work but are usually made more difficult for the gifted and often involve assisting the teacher.

Projects

These may be either individual or group. The individual project is often the scientific investigation, the creative writing assignment, or the social investigation. In the group project the gifted child is ordinarily assigned a leadership role in which it may be his function to summarize, criticize, or organize.

Free choice activity

Such activities are ordinarily extra work and are not graded or entered on the student's transcript.

Monitor and demonstrator

Able children are often used as helpers. They assist younger or less able children with reading, keep class records, or prepare and perhaps perform scientific demonstrations. The practicality of such activities may encourage thorough learning. Unfortunately, such assignments are sometimes made for the welfare of the group without consideration of appropriateness to the gifted subject.

Supervised correspondence study

This approach has largely been abandoned below the college level but was fairly popular in the first quarter of the century.[59]

The provision of more materials

Some teachers have selected among materials and set aside certain books and certain laboratory equipment for the gifted children. Through this method they have hoped to develop the creative resources of the pupil.

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[59] John Edward Bentley, *Superior Children, Their Physiological, Psychological and Social Development*, New York, W. W. Norton & Co., Inc., 1937, pp. 133–134.

Extra-depth assignments

These assignments are not extra projects but are projects of extra quality. The possibility of such an approach is determined by the availability of study materials and the ability of the teacher to assist the child.

Summer school and community opportunities

The activities are freqeuntly organized on an out-of-school basis but may use teachers and school equipment. Special offerings have been made in painting, writing, drama, music, and science.

Acceptability of Programs

Currents of social thought and military demands for technologists have increased the probability that schools will move toward more separation or segregation of the gifted. Nevertheless, it is unlikely that one administrative plan will be adopted for all schools and for all grades. A recent survey shows that special classes or special schools are not found in small or medium-sized communities which are characterized by favorable economic circumstances.[60] These upper middle class communities send 80 to 90 per cent of their children to college and, therefore, demand a college preparatory program for almost all children. It is also probable that the mean IQ in such schools is comparatively high and the majority of the students can effectively handle a college preparatory curriculum. Such communities spend more per student on schools, have smaller classes, can be more selective in hiring teachers and are more adequately equipped with community theaters, libraries, and other facilities. Consequently, they depend on enrichment in the regular classroom.

Private schools such as Francis Parker and Fieldston in New York City are largely under the same influences and serve the same selective population. These private schools, in turn, are like the public schools in Winnetka, Illinois or Bronxville, New York. They do not have special classes and they do not claim to have special programs. They depend on enrichment.

Small communities such as the one from which Nancy and Kathy came rarely have special classes or grouping. Grouping would be uneconomical and separation would often be unacceptable in the small cohesive community in which parents are keenly aware of the comparative position of their child. Parents are likely to demand for their children anything which is available to other children. Efforts to differentiate experiences are confined to individualized assignments made by the teacher, to monitoring and helping activities or to "club" programs. In small schools, gifted youngsters like Nancy and Kathy participate extensively in non-formalized activities which extend their experiences in quantity rather than in depth.

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[60] Havighurst *et al., op. cit.,* pp. 20–32.

In large cities with industrial and middle-class populations it is more possible to establish segregated classes on an efficient and economical basis. There is more demand for specialized and varied training, there is greater anonymity for the special class and for the neighbor's child, there are large numbers of handicapped providing a precedent for special classes and the mean IQ is low enough to create difficulty in providing for the gifted. Consequently, it should be expected that New York, Los Angeles, Detroit, Pittsburgh, and other large cities will be leaders in the establishment of special classes and special schools.

Special organizations are least likely in small closely-related communities and the likelihood is further reduced if the majority of parents expect their children to go to college and to enter one of the professions. Exceptions to these generalizations occur when persuasive leadership favors a view which is not usual for that community. The temper of the current situation is likely to bring specialized programs into many communities such as that which supports Elm Road but it remains clear that both educational and social reasons cause certain of the organizational patterns to be more acceptable in one place than in another.

All of the special programs aim at enrichment. They must be appraised before any choice is made. An organization should not be prized simply because it is neat or because it has been commonly favored. Special organizations or special administrative plans are valuable if they facilitate better teaching methods and better curricula. The quality of an educational experience is not determined by where one sits while he participates so much as it is by what he does while he sits.

10

Planning a Trial Program

The next decade or two will be marked by many attempts to provide for gifted children. It is to be hoped that experimental approaches will be imaginative and creative. It is difficult enough to arrange an education for Stephen though he has been picked as typically gifted rather than highly gifted. There are many children who pose more baffling problems. Tom is one of these. He was examined a few days before his sixth birthday because he was unhappy in kindergarten. His parents were surprised and disturbed by this development for they knew that he had eagerly anticipated going to school and they had expected that he would do well. Tom waited for Saturdays, sometimes cried before leaving for school in the morning, and then confessed that he was ashamed because he cried.

Tom was large, blond, pleasant, and well mannered. He enjoyed the test. He was interested in everything in the room but he handled only the items for which he had been given permission. At the end of the period he replaced every item that had been used and in each case he remembered its proper place. Between testing sessions he told his mother that he wished that they would ask questions like that in kindergarten because they "were sure fun." Why then should such a socially well-developed, eager, healthy boy be unhappy when the kindergarten teacher required simply that he should "learn to be like other people"?

Tom's performance on intelligence tests showed him to be in the top one-half per cent of people. The most effective evidence of his ability was found outside the test. His behavior was mature and well organized. He was asked, "Can you read?"

Tom replied simply, "Yes." At this point the psychologist produced a primer-level book and asked if he could read that. Tom assured him that this should be easy. He read with excellent expression and with no technical difficulty. The psychologist offered books at other levels in the first grade, at two levels in the second grade and at a low and high level in the third grade. Tom read with ease and with fine expression. Since books at a superior level were not at hand, the reading activity was discontinued until the next examination period. On the following occasion Tom read from various books from fourth through ninth-grade level. He read without major difficulty and then because the book supply had been depleted again, the examiner gave him a college text, *Abilities of Babies*. Tom was somewhat amused by the content but read such sections as the following:

> The human baby is very helpless when just born, more helpless than almost any other new-born creature. Yet he appears to be endowed (like other creatures) with a certain protective mechanism that enables him to respond to another of his kind. He is endowed at an instinctive level with the ability to move towards or accept the source of nourishment. He similarly demands and secures protection and attention. This comparatively simple situation, the early relationship between mother and child, constitutes the first simple social fact and, as the child grows, this relationship itself develops into the earliest true social relationship between two human persons. This first simple social fact would appear to be the most important and far-reaching circumstance in the whole of human development.[1]

Tom hesitated often and made errors in this level of reading. He was able to draw on phonetics and sense of relationship between words in order to correct himself. He read with expression and understanding. When he was asked what "a comparatively simple situation" was he said it was something easy to do. He had, of course, no previous experience with formalized paper-pencil tests but on a standardized reading test, he easily reached seventh grade rate and comprehension.

Tom's mathematical perceptions were almost equally good. He was given several of the Thematic Apperception Test cards. These were given in psychological rather than mathematical order. After four of these had been shown he said, "You intended to give them to me out of order, didn't you? You knew you gave me thirteen, seven, four, and nine?" He obviously recognized the numbers, understood their serial relationship, and was able to remember them through the administration of four cards. When he was asked if he could count he did so. He performed a few minor adding problems before he was asked to add 6 and 3, 16 and 3, 26 and 3, 33 and 6, 46 and 3, 56 and 3, 63 and 6. He hesitated on the first item but had no difficulty later obviously recognized the principle in the series. When he was asked to add 300 and 200 or 500 and 200 he did so easily and quickly. Throughout the examination, he enjoyed every intellectual challenge and, in a polite way, sought an opportunity to return.

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[1] Ruth Griffith, *The Abilities of Babies*, New York, McGraw-Hill Book Co., Inc., 1954, p. 9.

Tom is the oldest of four children. His parents are intelligent people whose technical education has not prepared them for raising a gifted child. They did not recognize his ability until neighbors were amazed by his reading. Then they became concerned about schooling. However, local school policy does not allow early entrance and the parents made a major effort toward restraining the child's learning.

The kindergarten teacher participated in this effort and the first school experience threatened Tom since the major requirement was that he should be more babyish than usual. Living up to the kindergarten expectations required the destruction of his self-concept and meant doing things which had been condemned by his parents and which had been denied him for years. He dreaded behaving as a kindergartener was expected to behave; at the same time he had enough social development to feel guilty for failing to meet expectations. Kindergarten provided few of the anticipated rewards and challenges. In response to a question on whether he liked kindergarten Tom said, "You know, I haven't really made up my mind."

Tom's problem and the problems of other children like him are not met by some easy administrative adjustment. It is not where he does his learning but what he does that makes a difference. It is unlikely that minor administrative change will much alter what he does. However, his education may be hampered if we insist on order before purpose or on administrative categorization rather than intelligent placement. Through consideration of learning principles as they apply to the gifted and through examination of existing administrative arrangement it is possible to state some broad principles which underlie suitable school organization.

Principles

1. *A program for the gifted is part of a total program and should provide unified and continuous experience.* In practice there is lack of continuity with elementary programs operating in some places without secondary programs while other places have secondary programs without elementary. Where there are programs at both levels there may be few common conceptions underlying the work from year to year or from level to level. Initiative on the part of the individual teacher or school is desirable but it needs to operate within a sound over-all program.[2] This structure is necessary if there is to be sequence in the student's experience, if there is to be continuing evaluation, or if the best research knowledge is to be implemented.

A survey of eighty secondary schools helps to prove that the best service to gifted pupils is found in schools which also meet the needs of other pupils.[3] It is likely that the gifted child will benefit when the teaching load is lightened, when teaching techniques are improved, when libraries and special services are made more adequate and, above all, when prevailing attention is turned toward individual differences.

Better programs do not come from sporadic administrative decision but from a period of study and preparation in which parents and teachers participate. The original impetus for the Portland, Oregon Program came from teachers but it was encouraged by the superintendent, the school board, and especially principals who sought to increase understanding of the problems and to devise means for solving them.[4] The first energies were not turned to program changes but to basic study and to examination of the current program with intent to improve rather than to discard. In a 1952 summer session on the campus of Reed College, representative teachers and principals from participating schools explored the literature, selected tentative identification procedures, and devised a temporary plan of operation. This research-minded approach with a broadly representative group contributes to the soundness and to the acceptability of the program.

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[2] Walter B. Barbe and Albert I. Oliver, "Strengths and Weaknesses of Special Groupings for the Academically Talented," *The Identification and Education of the Academically Talented Student in the American Secondary School*, Washington, D.C., National Education Association, 1958, pp. 78–88.

[3] E. M. McWilliams, "Gifted Pupil in the High School," *The Bulletin of the National Association of Secondary School Principals*, 39, No. 211, May 1955, pp. 1–9.

[4] Clifford W. Williams, "Questions and Answers on the Portland Gifted Child Program," Portland, Oregon, Portland Public Schools, mimeographed, 10 pages.

Articulation and continuity are most likely to be secured if the original study group includes teachers, administrators, special service personnel, and parents from every grade level and from every part of the school system. A general rule in education applicable to any group is that the total value of a program is improved when it is discussed and understood by responsible people representing every level and every subject-matter area. It is difficult to assure that teachers will have firsthand acquaintance with all problems. The most practical substitute may be found in systemwide planning and an evaluation in which the kindergarten teacher and the physics teacher work together to maintain a good total program.[5]

2. *Adequate programs provide for limited acceleration on the basis of ability with a maximum placement always below the mental age.* Acceleration should be early in a child's educational experience and should be based on a total evaluation of the pupil's fitness. This objective is more readily realized if the educational cycles are extended beyond the traditional one-year grade through organizing schools with some ungraded classrooms or with ungraded primary divisions (primary pools).

Teachers have generally rejected acceleration on the grounds that it promotes neglect of physical, social, and emotional growth.[6] Nevertheless, the major criterion for acceleration must be ability. A child with average ability and excellent background may perform at a high academic level but acceleration would probably injure rather than improve his learning situation. Once accelerated, the child must be able to maintain his position and this means that there must be evidence of high ability or high learning rate.

The limit for accelerated placement should always be below the maximum of intellectual attainment. A child of six years with high intelligence may have a mental age of nine or ten but his social growth will ordinarily be advanced only by a year or two and his physical growth by six or nine months. He will, for example, understand many words and many concepts without having the social and physical maturity necessary to implement his understanding. His placement must take account of total growth. An example of the problems which result from failure to apply this generalization occurred with a ninth grade boy of unusual brilliance. He had a highly developed interest in philosophy, religion, and history and was suddenly given increased access to books but was given little guidance. He was fascinated with Freud and read extensively in the field of psychoanalysis pursuing ideas which led to the conviction that values and morals were relative. He convinced himself that personal freedom required revolt against community morals and began to talk openly of his disregard for standards. He began also to write expressive and amoral poetry to ninth grade girls. These ideas were abhorrent to junior high school children and to their mothers. The boy rapidly earned a reputation for abnormality because his intellectual explorations were neither tempered with personal maturity nor with adult guidance.

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[5] Jeff West and Arthur S. Adams, "Articulation and the Academically Talented," *The Identification and Education of the Academically Talented Student in the American Secondary School,* Washington, D.C., National Education Association, 1958, pp. 88–89.

[6] W. F. Anderson and L. R. Davis, "Guiding the Gifted," *School Executive,* 76, No. 6, February 1957, pp. 82–83.

3. *Grouping is essential for specialized tasks and among older children.* Grouping is always used. An advanced class in algebra is a segregated class whether or not the term is used. An elective class tends to achieve some homogeneity because natural preferences draw together students who share common interests and relatively similar readiness. In the small rural school the skilled teacher was an expert in grouping. She disregarded grade classification allowing the child to participate at levels which were challenging and interesting. It is probable that such unplanned systems lead to gaps in learning and a serious frustration at the secondary level when the child enters a more rigid system. Better adaptations are made by modern "teaching teams" where three or four teachers in one grade or three or four teachers in three grades work together as a teaching team with the individual child participating at different times in different sections. This arrangement provides a greater range of activities, more expert teaching in certain areas, better utilization of consultants, minimum loss of homeroom advantages, and assurance that academic gaps will not result.

Grouping can be accomplished in a variety of ways. It should be fluid, based on learning currently in progress.[7] The criteria for selecting a group should be comparatively clear and easily interpreted. They should include elements of reading ability, mathematical competence, or other achievement items. Where such criteria are established, grouping seems appropriate; but there is little evidence to support separation in some of the arts, physical activities, or general courses which provide cultural background. Likewise, grouping makes little contribution where the nature of the task or the teaching method would normally result in individual projects or very unique assignments on a common project.

Certain activities produce grouping. Children gather by age and sex for games or people gather in terms of their experience for congeniality. These activities are not unlike the learning situation. The gifted child will exclude himself from activities which are boring and the dull child is excluded from activities through simple lack of contact or understanding. In such a case the need for differentiation of activity is obvious. A follow-up study of the Cleveland Major Work Program shows that more than 80 per cent of the graduates recognized some of these advantages of grouping but were concerned, too, with the lack of broad social contact and with the attitudes of other students and teachers toward the separation.[8]

There are common learnings of immense value to democracy. Some of these are best learned in the regular classroom with interplay between children of every intellectual level. Many teachers value the self-contained classroom as the ideal situation for teaching responsibility and social standards. The broader range of ability also provides a base against which talent may be evaluated or discovered.[9] The students profit from breadth of experience and acquaintance with others. It seems socially rash to run the risk of alienating the gifted from the general population or failing to provide for the broadest learning opportunities.

5. *There should be opportunity for thorough learning of basic concepts and fundamental skills but not mere extension in amount.*

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[7] May Seagoe Gowan, "Why Homogeneous Grouping," *California Journal of Secondary Education,* 30, No. 1, January 1955, pp. 25–26.

[8] Walter B. Barbe, "Evaluation of Special Classes for Gifted Children," *Exceptional Children,* 22, No. 2, November 1955, pp. 60–62.

[9] Charles A. Tenser, "Must We Segregate?" *National Association of Secondary School Principals Bulletin,* 37, No. 197, November 1953, pp. 75–76.

Enrichment does not mean doing more problems or covering more material. In many cases the gifted child should do fewer problems; he understands the process and does not need the repetition.

Even a child recognizes the fallacy in doing more of the same-level tasks. When Stephen was about ten years of age he asked a professor, "You're supposed to know something about teaching, aren't you?" The adult replied in mild affirmative and Stephen continued, "Well, tell me if this is right. We had thirty multiplication problems . . . you know, four numbers in the top and three numbers in the bottom. I finished the assignment quickly and began to read and then a student teacher from your institution came around and corrected them. I had them all right but the teacher thinks I read too much so they gave me thirty more problems exactly like the first ones. What I want to know is, do I learn anything from that?" A reply to such a question is all but impossible. The child may learn to hide the fact that he is finished or learn to slow down and not be finished. It is unlikely that he learns mathematics, good habits, or good attitudes toward mathematics.

This position does not discount the value of accuracy or exhaustive knowledge. Gifted children pride themselves on the quality of their work and should learn tables or other important rote tasks to a level of perfection which makes possible rote performance when these tasks are involved in higher level operations. The intellectually able child may "get by" in school with individually invented or unique systems which will cause him serious difficulty in high school or in a profession. Consequently, it is appropriate to require rigorous standards in operations which are simple but fundamental.

6. *A suitable program is characterized by individuation.* One conclusion is strikingly inevitable. There is no such thing as a right program for the gifted. The formulation of a program is continuously confronted by the fact that the possession of many abilities causes gifted people to be more variable in their behavior than is any other group. Retarded children have few choices and their behavior has much commonality. Gifted people learn in creative fashion and their learning tends to make them unique and individualistic. Their responses are characterized by variety and complexity and the program which provides for them is characterized by individuation. Such a program is bound together by emphasis on conceptualization and

creativity but it is best described in terms of activities and program variations rather than in terms of any single program.

The gifted child may do arithmetic at a fourth grade level, read at a seventh grade level, and solve science problems like a ninth grader. A narrow, segmented program, however well organized, is inadequate. Just as the overcomplete toy leaves no room for imagination, the overcontrolled program reduces hypothesis-test or leap-and-test learning experiences. When rigid departmentalization or rigidly arranged lesson plans are the rule, self-direction is denied, and learning ceases with the end of the class period.

A look at the Portland program

There is an increasingly large body of literature and experimentation on programs for the gifted. In some cases the investigations are elaborate and complex, involving many people over a long period of time. Notable work has been done in the Community Youth Development Program under the leadership of Robert J. Havighurst in the Chicago area and in the Talented Youth Project at the Horace Mann Lincoln Institute of School Experimentation under the leadership of A. Harry Passow.[10] These explorations involve the nature of talent, the effects of ability-grouping, the attitudes of under-achievers, the special abilities which underlie particular competencies, the value of special seminars, and other topics. Such large investigations are of special value because the interrelatedness of findings are better known and lead toward solutions of major problems. It seems fortunate, also that these studies acquire some unity from the fact that most of them accept a broad concept of giftedness to mean any "capacity for superior achievement in areas which will advance civilization." Though there is a need for local experimentation, hypotheses can begin at an advanced level based on work already done.

There is also a body of literature, including a 1955 summary,[11] which describes practices in specific communities. There is a good deal of economy and good sense in studying these plans before embarking on a local design.

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[10] A. H. Passow and A. Tannenbaum, "How Fare the Talented in Our High Schools," *National Association of Secondary School Principles Bulletin*, 39, No. 211, May 1955, pp. 10–15, and A. H. Passow, "Talented Youth Project: A Report on Research Under Way," *Educational Research Bulletin*, 36, No. 6, September 1957, pp. 199–206.

[11] Robert J. Havighurst, Eugene Stivers, and Robert F. DeHaan, *A Survey of the Education of Gifted Children*, Chicago, University of Chicago Press, 1955, 114 pages.

The Portland, Oregon, Gifted Child Project provides a suitable example for study. First of all, it is designed as an integral part of the school system with a homeroom emphasis in order to capitalize on the natural situation and on the good qualities of ordinary practice.[12] Ability is defined broadly. The children are selected because they have capacity for "remarkable performance in any worthwhile line of endeavor." They include about 10 per cent and as much as 20 per cent of the total school population. Identification is systematic and continuous on the assumption that ability may be demonstrated over a span of years rather than at a single point. The classification is fluid and the placement is never final.[13] Because the search for ability includes the search for many kinds of ability demonstrated in many places, teachers' observations are important and considerable energy has been turned toward developing special techniques for identifying and developing talent in creative writing, social leadership, creative rhythms, creative dramatics, and other special areas.

In the spring of 1958 there were twenty-eight elementary schools participating in the plan, with twenty-five hundred elementary pupils identified and nearly all receiving advanced instruction. In nine high schools 1,325 were participating in E. E. (Educational Enrichment) classes. The program operates as part of the total school system with a director of the Gifted Child Program reporting to an assistant superintendent in charge of curriculum and instruction. The director has two full-time assistants and there are other personnel who give either full or part time to the program. Administrative control is light and central office functions are not highly directive.

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[12] Liaison Committee of the Cooperative Program for Students of Exceptional Endowment, A Report Summarizing Four Years of Progress by the Cooperative Program for Students of Exceptional Endowment, Portland, Oregon, Portland Public Schools, March, 1957, mimeographed, 108 pages, and J. W. Edwards, "Portland Schools Give Attention to Talented and Academically Advanced Students," *The School Bulletin*, 43, No. 4, April 1958, p. 1.

[13] See Clifford W. Williams, "Questions and Answers on the Portland Gifted Child Program," *op. cit.*, and "A Plan for Identifying and Developing Talent in CREATIVE WRITING," Grade 6 (Revised) Fall 1956; and Robert C. Wilson, "A Plan for Identifying and Developing Talent in SOCIAL LEADERSHIP," Grades 4, 6 and 8, 1955, and "Screening Exercises in Creative Rhythms," 1955, and "A Plan for Identifying and Developing Talent in CREATIVE DRAMATICS," Grade 5 (Revised) Fall 1956; Portland, Oregon, Portland Public Schools, mimeographed.

A conservative quality in the plan leaves much direction in the local school. At both elementary and secondary levels the school operates with some independence in offering seminars and special opportunities, although these must fit into an over-all plan. It appears that the local school has retained a sense of autonomy and responsibility which might easily be defeated in a program begun in another fashion. Most principals feel that consultation from the central office is essential but this is not universally agreed upon.

At either elementary or secondary level the principal appoints a steering committee from the faculty. In the high schools the supervising vice-principal and the program co-ordinator are ex officio members of that steering committee. These groups meet to determine the type of program which is needed, to make recommendations for improvement, suggest means of enrichment, evaluate progress, and establish training courses for teachers.

At the elementary level the principal appoints a faculty member to serve as co-ordinator. The duties vary a little from school to school but ordinarily include responsibility for records, relieving teachers who teach special interest groups, chairing the steering committee, and assisting the principal in planning in-service work. A similar appointment is made in the high school with the appointee relieved of at least one class per day. It is agreed by principals at both levels that a co-ordinating person with some released time is a key to any worthwhile program.

At the elementary level an additional half-time teacher is assigned in each building to allow for the increase in responsibility and activity. Frequently, this person serves as the homeroom teacher while the co-ordinator carries on his special functions. Each high school has a full-time additional teacher or more. These teachers are essential in securing materials and in arranging for classes and seminars. Evaluation shows that additional teachers are vital to the program and in the Portland system this service accounts for 82 per cent of the total budget.

In elementary grades one through eight, a homeroom system is used with special efforts turned toward enrichment. The self-contained classroom is assumed to be the "center for educational stimulation of any particular group." Two outstanding teachers are employed to spend full time visiting each school at least once per week, consulting with other teachers and bringing ideas and materials for enrichment. There are problems of space, materials, range of ability, and numbers of students but the evidence is that the program has improved the general quality of the schools. Seventy-five per cent of teachers estimate that instruction is now better regardless of the group.

Classroom enrichment is carried strongly into the ninth grade, which in the Portland system is in the high school. An attempt is made to avoid mere additions or just more of the same and to assure, instead, that the offerings provide for more critical control of facts, for greater acquaintance with method and for more thorough penetration of ideas.

Special interest classes are begun in the elementary school in order to supplement instruction. The special interest classes provide greater depth and greater intellectual excitement but also reveal that a comparatively large number of students can handle courses such as first year algebra while in the eight-year elementary school. Consequently, special algebra classes are added to the foreign language, science, and language arts opportunities previously offered.

At the high school level there are special seminars. These courses move above and beyond the normal class with less prescription and with greater emphasis on self-directed study, interpretation, and critical examination of materials.

The seminars have been of four kinds. At the beginning there was a comprehensive seminar which tended to de-emphasize subject fields and provide for a broad general education. This is a desirable kind of experience but it tended to disappear from the high schools through administrative difficulty in scheduling and providing for it. A second kind of seminar was offered in a subject matter field in addition to the students' other work but it tended to disappear because students chose to put their effort in credit courses. A third kind of seminar has become more prevalent. This one is subject-matter oriented and designed to replace the regular course. Some of the advantages of these seminars are lost because teachers are reluctant to depart far from conventional course content but the seminars do make possible a broader treatment and do limit class size. The fourth kind of seminar is a special section of a regular course (E. E. class) designed so that students may benefit from instruction geared to their abilities. The course follows the usual content but encourages more varied reading and greater breadth.

The program enjoyed approval, with 58 per cent of parents who had children in the elementary special interest classes believing that academic interest had been increased while only 1 per cent felt it was decreased. New home activities related to school work were reported by 65 per cent of parents and 94 per cent of them wanted the classes continued. It is also important to note that the principals received no objections from other parents concerning the special interest classes. Among teachers, 84 per cent favored the special classes and 9 per cent disapproved. According to 68 per cent of the teachers the work of the homeroom was improved by these classes while 10 per cent felt that homeroom progress was hindered.

Elementary pupils were also satisfied, with 89 per cent feeling they had learned more in special classes. Two-thirds also reported an increased interest in school work. A desire to be in such a class again was expressed by 96 per cent of the children. Evidence indicates that the pupils made greater gains than matched companions who were not in special interest classes. The greatest gains were in reading but the children were also in more activities, had more intellectual hobbies and greater liking for academic subjects, enjoyed their teachers, and expressed more interest in learning. They had no greater adjustment difficulties; only 1 or 2 per cent ever reported that they suffered socially as a result of school placement.

A similar approval is recorded for the high school, with 93 per cent of parents preferring the program to continue because they felt it provided for more independent work, broader views through class discussion, better relationships with the teacher, better preparation for college, increased responsibility, and more adequate learning which resulted from the smaller classes. Secondary teachers favored the program in the ratio 83 to 6 while students expressed satisfaction with the seminars in 60 per cent of the cases. Secondary students were not impressed either by the greater difficulty of the seminars or the greater amount of work which was required. They thought their grades did not differ greatly from what they would have been in the regular class.

Research in the Portland situation has dealt with academic competence, with underachievers, and with personality considerations. Extended attention has been given to teacher education—classes are in session constantly. Special arrangements have been made for summer sessions. The consultative services, teacher education, and research enterprises have been carried forward in co-operation with Reed College.

The Portland program centers attention on good teaching more than on administrative organization but administrative design and attitude contribute to the local autonomy and flexibility important in the program. It is apparent, too, that administrative support, including financial support—which was estimated at only fifty-two dollars per student in 1957—assures the continuity and effectiveness of the program. It is apparent that the design of a program must include an organizational pattern which contributes to the chosen objectives.

A hypothetical program

The parents and the staff at Elm Road know that good programs do not result from happy accidents. It requires study to understand what is different about gifted children, to plan for identifying gifted children, and to agree on suitable educational goals. Only then is it possible to redesign the school situation in any profitable fashion. This new design is more likely to involve changes in teaching technique and in instructional material than in school organization. Nevertheless, it must always require an administrative disposition suited to necessary changes. Some programs have been abandoned on account of administrative or community opposition, but more numerous abandonments have resulted from administrative or teacher inertia and lack of confidence in special arrangements. The total evidence seems to call less for the adoption of some previously recommended program than for the recombining of procedures and the invention of new approaches.

Primary grades

Parents and teachers who would design a program suited to the needs of Pete, Nancy, or Kathy may be guided by awareness that these children are able to select among their experiences, to generalize, and to invent. These qualities became apparent shortly after birth and the differences are well developed by the time the children arrive in school. Program adaptations must begin early, for in the first weeks or months of school, creativity is encouraged or squelched, enthusiasm is warmed or cooled, and inhibitions toward learning are increased or reduced. *One of the most critical errors in many programs is lateness of inception.*

Gifted children are naturally observant and astute but they can improve their ways of thought and their ways of learning. They learn "how to learn" early and established learning patterns appear to persist. Examples of this persistence may be found among persons who are born and raised blind; when sight is acquired they have considerable difficulty in learning to see. They fall back on earlier methods of observation and if they are asked to determine the shape of an object without touching it they become confused and may respond with the remark, "Let me touch it and I will see." [14] Likewise, persons whose early education has been limited to the acquisition of facts tend to persist in memoriter kinds of learning while those who have learned wisdom and critical thinking seem to persist in this more judgmental kind of activity. Though proofs are limited, it may be guessed that introductory school experiences are very significant in determining the qualities of judgment, creativity, and scholarship which will mark adult life.

The first school years are filled with exploration and with extending the self. The family relationships yield to a broader society and the child wanders excitedly through the large new world which has opened before him. The school provides opportunities to develop adequate social behavior, reading ability, and communication skills which include counting. Strang has pointed out that during childhood ordinary environment supplies most of the necessary intellectual experiences.[15] With the school years, more intellectual opportunities should be available but enrichment continues to come primarily through breadth and range of activity rather than through depth. Though Nancy and Pete characteristically ask penetrating questions and search for complex understandings they are interested in everything and a sound program should provide a wide range of activities.

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[14] J. Z. Young, *Doubt and Certainty in Science*, London, Oxford Press, 1951, pp. 62–129.

[15] Ruth Strang, "The Psychology of Gifted Children," *Journal of Teacher Education*, 5, No. 3, September 1954, pp. 225–229.

Parents may suspect that breadth leads to inadequate work habits and superficiality but this is unlikely in the early school years. Elementary teachers are particularly adequate in dealing with individual differences and individual interests and the basic learning task, reading, is challenging and exciting. Gifted children ordinarily maintain enthusiasm and good work habits during the first and second years.

A planning committee at Elm Road will find that administrative adaptations at the primary level are usually confined to in-class grouping. There should also be a program of controlled acceleration with gifted children accepted as much as nine months early. This acceleration would be limited to those who are physically developed, socially mature, and with tested mental ages beyond the mental age for 60 per cent of the regularly entering class.

Reading is the central task of the first years and the gifted child enjoys enough proficiency in this skill to compete readily with his classmates during the first year and surpass them in the second year. If gaps exist between his level of motor development and that common to the class he may often close them in the second year. The end of his second year may be a suitable time for promotion to the fourth grade since more specific curricular content in the fourth, fifth, and sixth grades makes rapid promotion hazardous at a later time. It is likely that a student promoted so rapidly will be smaller than other fourth graders but he will be their intellectual equal or superior and may be expected to acquire physical skills fairly appropriate to competition by the fifth or sixth grade. Early acceleration provides for more continuous and appropriate learning levels and for more constant motivation.

An ungraded primary classroom would facilitate these promotions and assure the opportunity to develop skills of laboratory and workshop learning. Promotions beyond the primary level should ordinarily be made on evidence that the child can (*a*) read effectively, (*b*) use some phonic devices, (*c*) add, subtract, and understand the idea of multiplication, (*d*) co-operate and plan with others, (*e*) follow a plan, (*f*) summarize events and make some evaluation of his own contributions. These would be reasonable expectations for a child with an IQ of 125 at the end of a second year. Pete, not yet admitted to school, could now meet a number of these criteria. Nancy, in the second grade, will easily pass all of them. Kathy, in the first grade, will pass all providnig that the multiplication concept is liberally interpreted.

If the Elm Road committee accepts breadth and acceleration as principles for the primary school they could wisely decide that these were the last formal accelerations and that future efforts toward enrichment should depend on other devices. Following this decision, the total acceleration possible would be something between one year and one and three-quarter years which is below the two years ordinarily recommended by such authorities as Stedman, Hollingworth, and Terman. It is a cautious maximum but it provides reasonable acceleration if the remainder of the student's program is adequately enriched.

Intermediate grades

When the committee turns to the fourth, fifth, and sixth grades it examines a period of relative stability and tranquility in the development of most children. Hollingworth has called this the "golden age of the intellect." [16] Pupils are filled with questions of "why," "how," "when," "who," and "where." These are key years for academic learning and for the development of achievement patterns and habits of industry. No other period is more vital in the development of the scientist.

Freud, Rousseau, and others have urged that this should be a period used to develop underlying concepts and fundamental skills necessary for maturity. The child has established his relationships at home and made his introductions in the school but has not undertaken the competitive struggles into adulthood. His newly achieved sense of individuality and responsibility give him courage to open a Pandora's box of historic and scientific wonders. He is now better able to deal with disunity of experience which arises from graded classrooms and departmentalization than he was in the primary period or than he will be in the junior high school. He is challenged by academic learning and is independent enough to know that correction and criticism from the teacher is not catastrophic. He has the basic skills of learning, especially skills of reading and social co-operation. In this period, schools emphasize the fundamental skills, exactness, and the acquisition of information in mathematics, science, and the social studies. This emphasis is appropriate to the gifted; they accomplish the general requirements with comparative ease and economy of time. It is reasonable to require greater depth or concentration and more than average precision.

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[16] Leta S. Hollingworth, *Children Above 180 I.Q.*, Yonkers-on-Hudson, World Book Company, 1942, p. 292.

Enrichment through depth should be a major characteristic of the intermediate school but there should also be added experiences. It has been estimated that students of IQ 140 waste half their time in school while those of IQ 170 waste three-quarters of their time.[17] If enrichment is confined to depth there is extensive waste and gifted pupils are encouraged to dawdle. Additional experiences are appropriate to help the child practice and perfect his individual learning tools which were acquired in the primary grades. Project methods, with larger contributions and higher standards expected from the gifted, provide for continuance of independent work habits and for the addition of appropriate experiences. Seminars, clubs or hobby programs have sometimes been used. All of these devices allow for individuated assignments, the research approach to learning, the self-expression of reporting, and the development of evaluation skills.

Junior high school

A fundamental error is made by critics and armchair educators who would bring the first heavy academic pressure to bear at the junior high school level. First, they fail to grasp or use the potentialities which are characteristic of the child from eight to twelve years. Second, they fail to perceive that the junior high period is one of particular personal stress and social conflict in Western culture. The child examines his values and appraises himself as a preparation for adulthood. During this period students neglect academic learning and rigorous demands for accuracy because they are involved in a search for philosophic answers and for reassurances which arise from affectionate human relationships. There are many similarities between the primary school and the junior high. In each case, the child is making important separations from the family and trying to establish himself in a new role. His educational program should provide a wealth of exploratory experiences with many opportunities to build interpersonal communication, identification with adults, and a philosophic point of view. The social sciences and social skills assume a relatively important role in the educational pattern.

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[17] *Ibid.*, p. 287.

With the child's need to develop adult attitudes there is a place for courses in social problems, modern languages, economic geography, and literature, as well as courses in dancing, dramatics, and other expressive areas. Approaching adulthood excites broad vocational interest and the school may meet these needs by providing exploratory opportunities through club activities.

Though depth enrichment is not the major characteristic of good junior high programs it is not discontinued. Introductory vocational preparation creates a need for specialized courses. Specialization, in turn, provides a natural introduction to segregated courses where interest and ability are necessary to success. By the last year in junior high school the gifted child should be registered in one or two special sections or elective courses. These courses should probably be of a technical or foundation nature, perhaps in science or mathematics.

High school

Family values and personal interest will take Stephen to college and Pete is almost as certainly college-bound. Family traditions and vocational objectives may not make college so imperative for Nancy and Kathy but if they continue their intellectual and social enthusiasm they will want a college education. The National Merit Scholarship Corporation finds that a very large percentage of semifinalists aim for careers in the professions.[18] The planning committee at Elm Road must recognize that the majority of gifted children will elect a college entrance program in high school.

Hollingworth felt that college entrance programs were abstract, complex, and difficult enough to stimulate students in the IQ range of 130 to 150.[19] For these she proposed that the only enrichment needed was freedom from associates who were less adaptable. For students with IQs above 150 she recommended specialized schools and special enrichment. It would be very difficult for the Elm Road Committee to distinguish between a program suited to rapid learners and one suited to very rapid learners. This distinction would require skill in identification and pedagogical knowledge beyond that which is presently available. Separation into rapid and very rapid learning groups is ordinarily impractical from an administrative point of view and there is little evidence that separation of this kind serves any purpose prior to the twelfth grade. Terman was able to separate the *A*'s (very great success) and the *C*'s (bottom success for the superior group) only when they were mature. In retrospect it appears that the *A* group had been slightly more effective in language and general information during the elementary curriculum but the *C*'s were almost equally competent in most subject matter.[20] It was only in the twelfth grade that the *A*'s demonstrated academic superiority which then continued through adult life. Very sharp distinctions between the gifted and the highly gifted are inaccurate and probably not functional.

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[18] "Gifted American Youth Prefer the Professional Careers," *School and Society*, 83, No. 2086, May 1956, p. 192.

[19] Hollingworth, *op. cit.*, p. 315.

In high school the student finds a new idealism, an increased willingness for social co-operation, and a heightened need for specialized training. His needs for self-expression and critical thought continue but he becomes interested in finer interpretations and more exact knowledge in selected subject areas. These specialized ends are commonly met by segregation or grouping through the development of special sections. Separation or sectioning is most clearly indicated in those parts of the senior high school curriculum which are most essential to further specialized work or to scientific training. There is no blanket recommendation for grouping at the senior high level. Students should participate in activities of the total group when the activities are of a broadly cultural kind or when they are non-specific or general enough to encourage a wide range of performance levels.

In general

In their recommendations, the Elm Road committee must account for the fact that good programs are systemwide rather than schoolwide, that good programs are supported by the school administration, and that good programs provide for increased teacher time because individuation automatically involves a smaller teacher-student ratio.

To explain their plan the committee might develop the accompany-ing figure to point up the emphasis appropriate for each period. The explorations and the range appropriate to the primary grades gives way in the elementary school to enrichment through depth and exactness which is found in penetrating and concentrated attention to the regular subjects rather than to segregated activities. Junior high school revives an emphasis on breadth or social exploration with added curricular activities for gifted students. The added activities introduce specializations which are to be continued in the high school. In the senior high "fast" sections, entrance requirements for certain electives, and extra loads are reasonable.

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[20] Lewis M. Terman *et al.*, *The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group, Genetic Studies of Genius,* Vol. IV, Stanford, California, Stanford University Press, 1947, pp. 319–322.

The elongated grade or the ungraded classroom is peculiarly adaptable to individuation and to the self-directed learning appropriate to the gifted. These arrangements are superior to rigid year-by-year grade systems for they provide a range of activity, they assure greater continuity of experience and they provide an opportunity for the rapid learner to contribute to his society. Ungraded classrooms were preferred by Goddard in Cleveland and by Hollingworth who arranged the Speyer School in order to accept children at eight years and prepare them through a continuous program for entrance into the senior high at thirteen.[21] However, a decision to have ungraded rooms must be made with awareness that these rooms are particularly dependent on skilled teaching. The inexpert or uncreative teacher will fail more readily there than in the graded classroom.

If teaching is good the two- or three-grade arrangement provides an opportunity to participate in activities at the point of student readiness, eliminates the hazardous gaps which result from skipping, and meets the dual commitment of developing intellectual and social competence. It is particularly effective when combined with "team teaching" and when it utilizes assistant teachers and specialized consultants.

The Elm Road committee might recommend grouping in a two- or three-year cycle with some promotions each year. This helps to assure a continuity of friendship for both the gifted and the retarded. Friends go with the one who is promoted and friends remain with the one who is not promoted. This plan minimizes physical growth problems which are associated with acceleration, it encourages project

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[21] Henry Herbert Goddard, *School Training of Gifted Children*, Yonkers-on-Hudson, World Book Co., 1928, p. 109 and Hollingworth, *op. cit.*, p. 314.

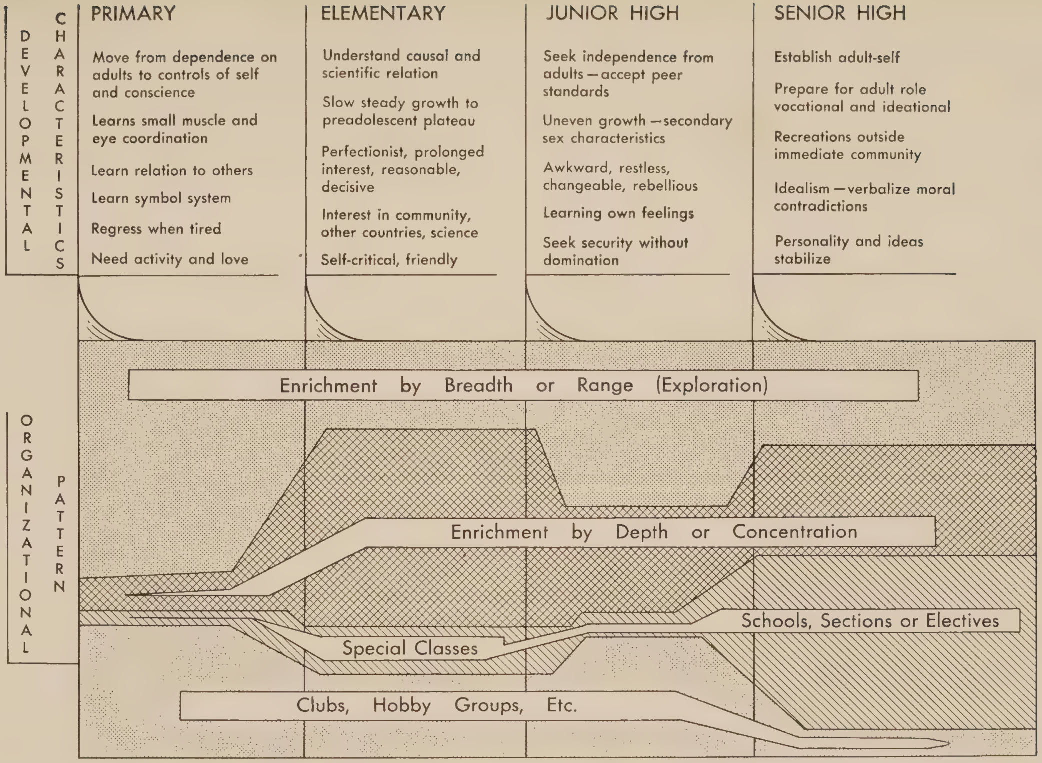
DEVELOPMENTAL CHARACTERISTICS
PRIMARY
Move from dependence on adults to controls of self and conscience
Learns small muscle and eye coordination
Learn relation to others
Learn symbol system
Regress when tired
Need activity and love
ELEMENTARY
Understand causal and scientific relation
Slow steady growth to preadolescent plateau
Perfectionist, prolonged interest, reasonable, decisive
Interest in community, other countries, science
Self-critical, friendly
JUNIOR HIGH
Seek independence from adults—accept peer standards
Uneven growth—secondary sex characteristics
Awkward, restless, changeable, rebellious
Learning own feelings
Seek security without domination
SENIOR HIGH
Establish adult-self
Prepare for adult role vocational and ideational
Recreations outside immediate community
Idealism—verbalize moral contradictions
Personality and ideas stabilize
ORGANIZATIONAL PATTERN
Enrichment by Breadth or Range (Exploration)
Enrichment by Depth or Concentration
Schools, Sections or Electives
Special Classes
Clubs, Hobby Groups, Etc.

Figure 8.

Distribution of Devices for Enrichment

and large theme approaches to learning, and it provides a natural organization for the homeroom plan. Core programs may be offered above the primary level with little or no loss of teacher expertism in technical fields. The core for one student taken with teacher *A* may center on science and mathematics while the core for another child with teacher *B* may center on the social studies and literature. Following the core period each student fills out his experiences through participating in departmentalized activities.

When the committee makes recommendations of this kind they endorse a system which facilitates longer work periods, extensive projects or undertakings, and integration of studies with the development of standards through prolonged and close relationship with a critical, friendly, and responsible instructor.

11

Curriculum and Educational Methods for Gifted Children

Among the experiences possible in the school some are inherently of prime importance. They may have high value because they have significance in human affairs, as is the case with science, or they may have priority because they serve as a basis for further learning as is the case for critical reading.

Some Basic Considerations

A California study shows that there is a general willingness to rate as most significant in programs for the gifted, objectives of great difficulty or objectives which involve ability to generalize and apply knowledge.[1] Objectives in areas such as family life, the use of leisure and health, are considered of equal importance for all children and are not planned in a special way for the gifted. In some cases, the increased academic demands have greatly reduced participation in other learning activities. The relative emphasis on these goals should be determined not by chance factors but by careful consideration of the anticipated outcomes and the nature of the learner.

The personal nature of learning experience

No learning is simply intellectualized away from the experiences and emotions of the learner. Personality is the instigator and director of scientific invention in much the same way as it is the instigator and director of artistic activity. The unique idea depends on intelligence but it comes most readily from the "open person." [2] This is one open to experience, able to use his intelligence potential in imaginative and creative behavior. Good teaching for such persons does not insist that all children shall see things in one way, for differences are basic to uniqueness. Good teaching seeks to provide the security and affection under which the unusual try is made and under which self-correction is possible.

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[1] California Elementary School Administrators' Association, *The Gifted Child: Another Look*, San Francisco, California Elementary School Administrators' Association, 1958, p. 157.

This teaching is not merely a matter of assigning, telling, and evaluating. It is a matter of fostering an atmosphere of inquiry. A study of historical cases leads to the observation that gifted children who have been overloaded with factual and memoriter education develop into informed but stereotyped and non-creative adults. Technical knowledge is more readily brought into invention and reflective thinking if it has been acquired through discovery and self-direction.[3] The learning which follows investigation is fundamentally more dynamic and more penetrating than that which takes place without investigative methods. It is probable that personal involvement and responsibility for learning along with the personal relationship between student and instructor accounts for a large part of the success in tutorial courses.[4] Adequately handled, the tutorial course is marked by an atmosphere in which the instructor accepts the learner as one who wishes to learn and grow and be responsible for what he knows. It is an atmosphere for open and creative investigation of the topic.

Technical competence is imperative but it is only one among several imperatives. Able students have need for cultural understanding, developed sensitivity, and a special need for reflection and for evaluation of legitimacy in their procedures. They may not neglect the "know-why" for the "know-how." These judgmental qualities and the willingness to use knowledge in humane ways are personalized outcomes of learning.

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[2] Robert E. Bills, "Our Best Defense," *Educational Leadership*, 16, No. 1, October 1958, pp. 17–20, 59.

[3] Ian C. MacDonald, "Education Import of the Growth of Learning," *The Alberta Journal of Educational Research*, 3, No. 1, March 1957, pp. 6–23.

[4] Lloyd S. Michael, *et al.*, "Secondary-School Programs," *Education for the Gifted, The 57th Yearbook of the NSSE, Part II* (Nelson B. Henry, Ed.), Chicago, University of Chicago Press, 1958, pp. 263–315.

Accuracy and technical sophistication

Technology, application of the scientific method, the growth of museums and libraries, and the improvement of communication and travel have greatly increased the volume of knowledge and multiplied the number of specifics to be learned. This abundance of information and fact has developed simultaneously with demands for technical mastery and specialization. The accumulation of knowledge and inescapable demands for expertism place emphasis on education suited to the technician. Expertness is essential to the gifted student who may join a profession where competence is a prerequisite for advancement or for contributions in the extension of knowledge.

It has been suggested that should some malevolent person decide to incapacitate students for effective thinking he should encourage discussion and class participation which either does not require accurate and essential information or discussions and class activities which center on problems so difficult and so removed from the students' experience that no real understanding occurs.[5] Either course interferes with intellectual develpoment. Pertinent and usable facts are necessary to any thought which is not to be fuzzy, inaccurate, or invalid.

The facts of science, history, and mathematics are so essential to thought in general that depth in these subjects is not likely to produce narrowness in the able student. Those who fear that a thorough study of any academic subject will produce the kind of person who knows more and more about less and less until he knows everything about nothing fail to understand that the truly intelligent person perceives relationships readily and is in a constant search for meaning and wholeness. Desirable school experiences provide opportunities for learning specifics and for using specifics with ingenuity. Knowledge and imagination each play a part when the child is asked to list the modern devices which would cease working if glass suddenly disappeared from the world.[6] They are both brought into play when the able child in the elementary school is asked to respond to the following question: "The temperature of air is greatly increased when, under high pressure, it is forced out of a tank through a small jet. Would it be possible to cool a room with uncooled air by forcing it out of a tank under comparatively low pressure and through a large jet? How can you explain your answer?"

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[5] Ernest Horn, *Methods of Instruction in the Social Studies*, New York, Charles Scribner's Sons, 1937, p. 108.

[6] Ruth Martin, "An Experimental Program for Gifted Children in the Intermediate Grades," Seminar Study, Berkeley, California, University of California, 1955, unpublished.

Requirements and standards

High standards are appropriate for rapid learners. Any student should work near capacity toward goals which are attainable but difficult. Some critics of education seem to think that maturity and learning are encouraged only by uncongenial tasks. Simple observation indicates that humans learn from both congenial and uncongenial situations and that degree of discomfort is not a criterion of value. The human learns the solution—he learns a way of dealing with the situation. If he learns how to deal with an unpleasant situation, then that learning is valuable; and if he learns how to deal with a pleasant situation, that value may be equally great. The greater merit in the pleasant situation or interesting task comes from the fact that the student participates in it more readily and more actively.

A demand for better-than-average performance from gifted students need not decrease invention and creativity. Nevertheless, it is inappropriate to choose a curriculum which is difficult simply for difficulty's sake. In 1892, the National Education Association's Committee of Ten pointed out that a pupil might solve a difficult problem and be pleased for having solved it without improving his own mental functioning. Improvement comes because the pupil has a better command of principles and this is sometimes more adequately achieved by concentrating on comparatively simple problems which involve interesting combinations of ideas. One invests energy when the problem seems important and solvable. Dull children avoid incomprehensible tasks and gifted children do not involve themselves in oversimplified lessons or unchallenging problems.

Standards themselves do not remain constant. Reading requirements for 1900 were related to the one-textbook course. The textbook was to be read with great care, underlined, memorized, and appraised. Similar standards of reading are inappropriate for students who will attend colleges where there is no textbook and where the bibliography for one course will probably include twenty and may include a hundred books. Modern standards of good reading require greater speed, more astuteness in selecting and arranging central points, increased ability to evaluate and interrelate, and considerable capacity to ignore unessentials.

To argue that the old standards are inappropriate or to argue that simple toughness does not make standards is not to discount the place of standards. In educating children of superior ability there is no place for shallowness nor should ideas which are marked simply by shock or by sparkle be placed at the same level with those which are characterized by genuine understanding. Sound standards are not achieved in parrot-like knowing but in responsible learning which improves behavior and increases invention.

Any highly intelligent child who does not live up to his ability will be handicapped as an adult. This generalization must be extended to both social and academic matters. Educational leaders have never been satisfied to substitute social and hobby activities to fill the time of students who have unusual academic capacity. These opportunities may appeal to the child but do not occasion suitable learning. When these activities are appropriate they should not be denied but neither should they be construed as challenging to superior capacity. These substitutions may produce laziness and superficiality and result in work attitudes which impair adult achievement.

School critics seriously overestimate the educator's willingness to substitute football and fly-tying for intellectual activity. Most teachers resent the constant interruptions of academic pursuit and frequently propose that parents should take an increased responsibility for the social and cultural education of children. Despite these convictions the teacher lives in a society usually more ready to appropriate money for competitive athletics, musical activities, and buildings than for the improvement of instruction. On rare occasions when community attention is turned toward academic achievement it is likely to be pinpointed on the spectacular rather than on the fundamental. The interesting laboratory or mathematical trick is more startling and exciting than scholarship.

Core or large-unit curriculum

It is impossible for the school to deal in detail with all fields or with all of the materials from one field. A superficial exposure to an expanse of knowledge encourages vague and sloppy thinking. To secure depth without neglecting breadth, studies may be organized around central or core principles rather than scattered in a "cover everything" approach. This provides a system of concentrations with lateral or horizontal connections between areas or ideas. The curriculum might be described as a network in which the points of concentration are exhaustively studied and tied together or interrelated by an overview which may come from the teacher, from a class report, or from general reading.

The Hunter Elementary Program (New York) uses a theme emphasis, disregards formal subject-matter boundaries but does not disregard subject matter.[7] This is called a deformalized system and provides for longer study periods, for natural integration and greater individualization in work assignments. Therefore, it capitalizes on the intense durable interests of gifted children, develops a sense of self-criticism and insures time-saving in learning interrelated skills such as the language arts. The work unit approach has been most frequently social studies centered. The content of social studies is particularly adaptable to the larger unit and provides for a range of difficulty within a single topic.

As early as 1935, some programs for rapid learners used the Mastery Unit Technique which had been developed at the University of Chicago.[8] Here teachers prepared guide sheets in order to relate the current study to previous ones and to motivate interest in the dominating ideas of the current unit. Modern practice is less formalized than the Mastery Unit Plan but continues to encourage individual study, free reading, class reporting, and critical thought. A combination of subject matter economizes on time, allows the development of leadership, and provides a laboratory for the learning of tool subjects. This approach seems particularly appropriate to students who need not be tied to simple units, concrete materials or immediate ends.

The unit approach requires more flexible and imaginative teaching since teaching becomes more difficult as methods move away from disciplined memorization. Edison's teacher pointed him out to the school inspector as a boy who was "addled." Edison stood at the bottom of his class and the teacher was dismayed because he did not "learn the book." She was further disturbed because he was forever asking questions which were not in the lesson at all! [9] The theme or the unit approach would have been more nearly optimum for Edison because it encourages students to introduce new questions and new ideas. It provides for the curious and inventive learner to a degree which is impossible in the regimented classroom or with the stereotyped teacher.

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[7] Gertrude Howell Hildreth, *et al.*, *Educating Gifted Children at Hunter College Elementary School*, New York, Harper and Brothers, 1952, pp. 50–56.

[8] Samuel Steinburg, "History and Civics," *Educating Superior Students* (Helen Louise Cohen and Nancy G. Coryell, Eds.), New York, American Book Co., 1935, p. 114.

Communication and Reading Tools

The gifted person needs the tools of spelling, mathematical computation and the like, and he has a special need for communication skills, research skills, and group skills. He should be proficient in discovery, research, critical thinking, and persuasion.

These proficiencies demand library skills—the ability to read graphic materials, take notes, summarize, and present conclusions in a clear and understandable fashion. The research and study skills are inseparably associated with the group and communication skills. Consequently, most special programs have encouraged study in small groups because these situations relate creativity and judgment to the socialized techniques. They provide a natural opportunity to search out, evaluate, and present ideas.

Communication is a vital objective and one which involves some of the most difficult intellectual tasks in the use of symbols. Symbols are essential for formulating ideas, stabilizing memory, comparing things, giving facts or suggesting subtle relationships in experience. They provide for the incorporation of new ideas with memory. Typically, students who do not possess extensive and accurate symbolic skills in measurement are handicapped in science. Those with limited skill in mathematical communication are clearly incompetent to observe electronic data or to evaluate modern philosophy. Competency in thought demands skill in communication and this skill is a major objective in the proper education of rapid learners.

Communication depends primarily on ideas and human relationships but is not effective unless grammatical and other minimal requirements are met. Accuracy and perfection of detail contribute especially in research and in the presentation of complicated ideas. Some writers have emphasized the value of penmanship and language-training because these are so necessary in the academic tasks.[10] Others, including the faculty at Hunter Elementary School, stress the value of early communication experience through speaking to groups and recording one's ideas without undue attention to minor grammatical errors. Later, they encourage the student to evaluate both the idea and his mode of presentation.[11] Early emphasis on the idea, not the technique, encourages free and meaningful expression. As the child matures requirements are set on the technicalities of penmanship, grammar, speaking, and presentation. Such procedure is consistent with the original generalization that technical skills should be taught and mastered but that they are subservient to the central or the conceptual learnings.

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[9] John Edward Bentley, *Superior Children, Their Physiological, Psychological and Social Development*, New York, W. W. Norton and Company, Inc., 1937, p. 241.

Most superior children have an unbounded interest and extended experience in reading. In a search for answers and in response to provoking questions, they are likely to develop the capacity for critical or judgmental reading which is so substantially mixed with advancement of their learning. In the Stanford studies none of the gifted read less than the average child, and 88 per cent read more.[12] Reading records demonstrated that seven-year-old gifted children read more than the average fifteen-year-old and that eight- or nine-year-old gifted children read about three times as much as ordinary children of the same age. They read over a wide range of subjects with large concentration in science, history, biography, travel, folk tales, informational fiction, poetry, and drama. On the other hand, they read proportionately fewer books of adventure and mystery and far less emotional fiction. The boys had particularly catholic reading habits and read extensively in books which would ordinarily be considered "good" literature.

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[10] Harry J. Baker, *Characteristic Differences in Bright and Dull Pupils; An Interpretation of Mental Differences, with Special Reference to Teaching Procedures*, Bloomington, Illinois, Public School Publishing Co., 1927, pp. 54–55.

[11] Hildreth, *op. cit.*, pp. 119–120.

[12] Lewis M. Terman, *et al.*, *Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. I, Stanford, California, Stanford University Press, 1925, pp. 441–454.

Elementary pupils in the Speyer School used the library as effectively as did Normal School students and they needed a library which was equally extensive and complete.[13] Intelligent children have a great deal of spare time in the regular classroom. With this they have compelling needs for intellectual nourishment and the self-direction to make reading fruitful and satisfying. It is perhaps safe to say that no equipment approximates the value of books in the education of the gifted and that no organized learning opportunity is more valuable than the library.

This extended interest and experience may reduce the need for formal reading instruction but teachers must in varying degrees accept responsibility for stimulating the development of special skills required for securing exact information, analyzing a point of view, skimming or spotting a particular piece of information. While it would be unwise to eliminate free reading and browsing, much of the gifted child's reading should be purposeful or goal-directed.

The well-equipped librarian plays a major role in programs for the gifted. She performs functions which are much more important than simply teaching the child to use routine skills in finding information. Long before his age mates, the superior child should have skill in using tables of contents, glossaries, cross references, and supplementary publications. He has more urgent need than they for abilities to discover and follow central ideas, skim intelligently, determine meaning from context, and outline or summarize. The successful librarian assists him in learning these skills and she encourages the development of tastes and interests. She provides not only enthusiasm for reading in general but enthusiasm which is focused on genuine interests and on carefully valued or judged materials.

The child with superior intelligence reads widely and requires much more than textbooks. Scientific magazines, industrial publications, and other sources which might be of little general interest are essential to his development. Ordinarily he prefers books which would be chosen by older children. This should be expected and should not be discouraged. An accountant-like approach to librarianship and a "keep-in-step" philosophy frequently combine to destroy initiative and growth in such a child.

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[13] Leta S. Hollingworth, *Children Above 180 I.Q.*, Yonkers-on-Hudson, World Book Co., 1942, p. 293.

Stephen experienced an attitude not unlike that reported by other children. While in the fourth grade he enjoyed reading rather complex materials, particularly scientific journals and publications. Requests for permission to visit library rooms which were assigned to junior high students were denied and he was refused permission to borrow books classified above his age level. He received the explanation that should he read these books now "there would be nothing to read" when he reached the junior high. Such a point of view is obviously faulty. When Stephen became a seventh grader he was interested in some college and many senior high school books. We may expect these mature interests to continue. It is unlikely that intelligent reading of any material could ever be the inhibitor of future activity. Like most exploratory activities reading creates enlarged vistas and wider fields. It is, of course, important that guidance in the selection of books be provided, for desultory reading is no assurance of adequate experience. Nevertheless, guidance should be determined on the basis of the child's need rather than on library classifications of particular materials.

Classroom Management

Classroom management can afford opportunities which are suited to the growth of gifted children. Participation in service activities is frequently advocated because gifted children have extra time, because they make unique contributions to group welfare, or because they provide genuine assistance to the teacher. Each of these reasons has some merit, but combined they are not sufficient cause for assigning service functions to gifted children. Neither should these assignments be made simply to counterbalance intellectual enthusiasms.

Highly intelligent children should participate in routine and management responsibilities such as school patrol, lunch detail, or clean-up committees when they need to learn the routine or the responsibility which is involved. Opportunities which enhance social development or ability to organize and explain are desirable but it is necessary to guard against the temptation to secure free clerical and custodial help.

Gifted students sometimes utilize their abilities as teacher aids. They assume responsibility for helping someone else understand an idea or skill and this activity provides opportunity for clarifying their own thinking and evaluating their own accuracy or knowledge. Teaching and demonstrating responsibilities may increase the permanence and depth of understanding. These students assist others in the use of encyclopedias, atlases, and special references, or in organizing reports. Such assignments are appropriate in limited amount and if the temptation to use gifted students as projectionists and warehousemen is resisted.

Able children may serve as resource persons. In searching out materials for the class they expand their own learning. In presenting material to the class they secure valuable experience in the organization and arrangement of ideas. Committee work provides a challenge to their ability and an encouragement to orderly self-discipline. The contributions of able students assist the class and change rather than lighten the teacher's load. The teacher continues to guide the gifted child in organizing discussions, in evaluating, summarizing, and judging the soundness of conclusions, and in developing social behavior which is suited to the advancement of the assigned project.

A conversation between Nancy and Kathy illustrates the need for early training in library skills and also illustrates how a child learns through trying to teach another. The girls were cleaning and rearranging their library at home when Kathy said, "I finished dusting the shelves. Now, shall we put the big ones on the bottom?"

Nancy replied, "No, let's arrange them like at school. In our room we have all the books of one kind together . . . like science books and story books."

Kathy considered this a moment and suggested that some science books were stories, and so Nancy explained, "I think you just read the book and then make up your mind which it is, most . . . science or a story. It would be just the same if you had a story about animals. There might be people in it too, but if it's mostly about animals then it would be called an animal story."

"We have lots of animal books," said Kathy. "Should we put the animal books on the top shelf?"

"O.K., and then we can finish out that row with stories about children and on the second one down we'll have stories about people. Then fairly tales . . . we have a lot of those. The bottom shelf can be for everything else. We should alphabetize each shelf. Then we can find just what we want."

"What do you mean?" asked Kathy.

"Well, look at the name on the book and then put them in place by the first letter. *Alice in Wonderlnad* comes before *Bugs Bunny*."

"Oh, like A, B, C—O.K., I'll start on the animals because I like animal stories best. I have *Animal Gym* and *Bugs Bunny* so I'll put *Animal Gym* first. Now what do I do? I've got two of one kind. I've got *Animal Gym* and *Angus and the Ducks*. Should I put the yellow one first?"

Nancy considered a moment and said, "No, then it's harder. You have to count the second letter instead of the first one."

"But we're doing it by the first letter so that isn't fair."

Nancy smiled, "Sure it is. You still use the first letter—but the first letters are the same, so—that makes them even and then you go on to the next letter and you see which one of them comes first in the alphabet and that's the one that counts."

"Oh."

Nancy continued, "For *Animal Gym* and *Angus and the Ducks* you start even and then the one that goes in first has to be picked by the second letter."

"O.K. A-N . . . A-N! But the *second* letters are both N's!! Your system doesn't work!"

"Oh—oh! That one is even harder. You have to go on to the next letter. Let me look at them. See, it's A-N-I and A-N-G so the A-N is even with the A-N and you have to decide between I and G. Let's see now—G-H-I. In the alphabet G comes first. It comes before I so A-N-G comes before A-N-I and you put *Angus and the Ducks* in first."

"That's pretty hard. Maybe we should just do it by the size of book. Anyway this is going to mix the colors all up."

Nancy explained, "But if you know the name of a book you can find it quicker this way and this is the way they do it in a library."

"What would happen if I had a word beginning with two B's?"

"What word?" asked Nancy.

"Oh, I don't know one. But what if I did have one? Don't you know any?"

Nancy thought a bit and said, "No-o-o—I don't know—but I'll bet that two B's would be even with one B and you might have to count the next letter after the B's." She giggled and continued, "I don't think there is a word like that 'cause you'd sound like you were stuttering. B-b-b. I guess they don't make words with two letters together."

The girls then tried sounds like p-p-p-p and s-s-s-s and m-m-m-m. Kathy's face suddenly lit up and she said, "Oh, yes you can make words with two letters the same. Moon has two o's."

"And foot has two o's and soon has two o's. Yes, some words have two of the same letter together. It seems to me though, that some letters just don't go in pairs. I don't quite know why—some can and some can't."

This discussion lost interest for Kathy as the sun splashed across the floor and she said, "Wow, there's the sunshine! I'll bet Mother will let us go out and ride our bicycles after lunch but we'd better get these books in before."

"Yes, let's hurry. Let's just put them in by the first letter today and then tomorrow we'll put them in more carefully."

Kathy proposed the solution which was accepted. She said, "Let's just put them in by color. That's real quick."

These children learned much from working together. Likewise in the school situation the older, the wiser, or the more intelligent child promotes his own growth through assisting others. This is particularly true when his usefulness depends on his ability to simplify and organize his own thinking.

Non-academic activities such as parties and assemblies provide special opportunities for social and organizing experiences. The Hunter Elementary School has used the assembly as a creative enterprise in which the teacher acts as troubleshooter more than organizer and designer.[14] These occasions provide opportunity for gifted children to see at close range not only how they lead but how others work in order to accomplish. The assemblies are the culmination of group activity closely tied to the classroom study theme which is currently in progress.

Another important schoolwide activity is participation in the school council. It is probably unnecessary to detail the values of this activity in the proper education of able children. This vehicle provides contact with the adult community, provides for the use of reason in problem-solving, and provides laboratory conditions for education in informal and formal social techniques.

In order that school management and social education may be appropriate to gifted children the standards must be altered to fit their peculiar characteristics. Terman found that gifted children of nine years had reached the level of character development which corresponded roughly with unselected children at fourteen years.[15] Social interests and social standards set for the average classroom are inadequate for them. Schools should not be smug because intellectually able children have excellent character and social traits. Neither should they be smug because these children take a major part in the activities of the school. It is necessary to assure that the activities provide for the improvement or for the growth of these positive character qualities found commonly among the gifted.

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[14] Hildreth, *op. cit.*, pp. 138–142.

Games and Play

In the face of evidence that gifted children are physically large, well developed, and mature in social interests, there persists a belief that they become so entranced by intellectual pursuit as to neglect social and physical development. In selected cases gifted children may not find congenial playmates and boredom turns them to reading, calculation, designing, compiling, imagining, or other solitary pursuits. Some may tire of immature play much as an adult does not enjoy continuous "child play." In still other cases, they insist on very organized and complex games and thereby separate themselves or incur the resentment of less able age mates. Several historical instances of limited activity may be cited. Emerson had no physical disability but he rarely participated in, and seemed uninterested in, children's games. As a child, Newton worked on machines, Darwin made collections, Shelley read, and Byron dreamed. Such behavior seems normal rather than abnormal for the able child whose play environment is not stimulating. These instances should not be contorted and enlarged to conclude that very intelligent children are not interested in play.

Stephen is particularly interested in the social activities of older people, in reading, and in model building. Among the four children considered here, he most nearly fits the common stereotype of giftedness. If there is any special hierarchy among beachcombers, then surely Pete must one day take the throne as king. He is an avid explorer. His strong legs take him everywhere on the beach and bluffs and his nature lore combines with ingeniousness to get him close to birds and to animals. He is the hero of smaller boys and the friend of bigger ones for on the close companionable hike there is no partner better than Pete. At parties and in group games he selects slightly older companions. He is active and eager; his behavior is pliable but could not be called docile.

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[15] Terman, *et al.*, *op. cit.*, p. 517.

Nancy and Kathy are social leaders in school and at home. Their pony is a neighborhood favorite. They rode tricycles early and both now ride bicycles. They are as eager for activity as they are curious and enthusiastic about reading.

It is unwise to assume that gifted children are commonly less interested or less effective in play than are other children. Studies show that they seek companionship in about the same degree as comparative or control children. Their play experiences are almost identical in amount though not in kind. Terman found that gifted children are slightly less competitive, slightly more interested in quiet and thoughtful games, and slightly more involved with imaginary playmates and imaginary countries.[16] Naturally, their play information (knowledge of games) was considerably greater than that of control children and they enjoyed games which were ordinarily preferred by children older than themselves. The Stanford sample demonstrated greater maturity indices for the ninety activities studied and the boys were higher on masculinity ratings than were control boys.

A survey of out-of-school activities for children from the Hunter Elementary School showed that they prefer playmates of their own age but, in larger proportion than children in general, they enjoy older children and adults. They associated with schoolmates, neighbors, relatives, or members of a common recreational group. One-third of the children attended a movie each week, half watched television as much as four hours per week, more than one-third were members of some organization such as Scouts, Brownies, and the YMCA. The parents reported "favorite" activities. Comparatively few reported "favorite" interest in television-viewing, movie-going, or radio-listening.[17] When the activities were grouped the parental reports showed that 64 per cent favored dancing and dramatics, 25 per cent favored music, 19 per cent favored art, and 12 per cent favored crafts. Though these figures may be biased through the wishful thinking of parents, the report indicates a strong predilection for outdoor sports and for social activity.

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[16] *Ibid.*, pp. 385–439.

[17] Hildreth, *op. cit.*, p. 182.

Active play interests should occasion no surprsie. Superior children require little time to complete academic work. They have time for leisure, for dreaming, and for playing. The gifted person with slightly greater physical status and superior personal development is likely to achieve a satisfying place of companionship or leadership. Gifted groups achieve unusually fine success in athletic and social activities—a fact recognized in the Rhodes scholarships and several other scholarship programs. Candidates must demonstrate not only academic ability but also social leadership and athletic excellence. These expectations are compatible with evidence which shows that younger or gifted entrants at Columbia and Barnard and other colleges participated more extensively and in more sports than older and control students.

The play interests of childhood show some permanence. Twenty-five years after the initial study Terman found his group had persistently broad and active avocational lives.[18] As adults only 10.9 per cent of men and 14.9 per cent of women reported no avocational interest. Almost one and a half times that many reported four or more major interests and the vast majority reported from one to three. Terman concluded that he should be greatly surprised if an unselected population would be found to have such numerous avocational outlets. The activities reported were not withdrawn, remote or antisocial ones. Sports were in first place for both sexes, being reported by 61.8 per cent of the men and by 46.4 per cent of the women. Photography, music, and gardening followed with intellectual activities of reading and making collections in fifth and sixth places.

The fantasy of play and the expenditure of physical energy are ordinarily perceived as good in themselves but play is also expected to produce physical health, fairness, and courage. Schools hope that recreation will promote the development of safety skills and social attitudes, but Hollingworth was moved to remind educators that it was futile and unsound to teach games which were beneath the child's capacity on the basis that it "socializes" him.[19] She felt that many efforts were doomed to failure simply because the activities offered were on a level of organization below the demand of the student. She deplored the requirement that all children should participate actively in all games. Nevertheless, she did propose that the few gifted students who respond poorly to social and gregarious drives should be encouraged to participate in simple play and in complex games as a natural defense against isolation. Adequate arrangements must assure a range of activities and a range of ages among which gifted children may participate in some activities which are complex enough to assure challenge and others where the companions are, like themselves, young and immature.

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[18] Lewis M. Terman, *et al., The Gifted Child Grows Up, Twenty-five Years' Follow-up of a Superior Group, Genetic Studies of Genius,* Vol. IV, Stanford, California, Stanford University Press, 1947, p. 205.

It has occasionally been suggested that play and competition with less able companions may produce subtle aggression and cunning maliciousness among gifted children. This is unlikely since all children are naturally gregarious and communicative and they seek to enjoy and to be approved. The graded school and the highly organized community recreation program tend to handicap children whose abilities are above age level.

Motor ability and manual skill are not found to be a single trait or factor but each is associated with identifiable factors which are in turn correlated with intelligence. In general, the gifted are slightly above average in motor and manual skills but in rare cases they are inadequately developed. This condition is occasionally found among very highly accelerated children or among children whose parents set very academic goals. These students are short on play and physical experience, they recognize their limitations, and they avoid school activities. Unfortunately, their avoidance is sometimes strengthened by teachers who advocate that gifted persons should participate in athletics through assisting the teacher in a testing program, servicing equipment, or record-keeping.[20] These service functions fail to provide for physical needs and frequently the students might secure more valuable managerial and organizing experience in other school assignments.

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[19] Hollingworth, *op. cit.*, p. 275.

[20] Henry J. Otto (Ed.), *Curriculum Enrichment for Gifted Elementary School Children in Regular Classes*, Austin, Texas, Bureau of Laboratory Schools, University of Texas, Pub., No. 6, 1955, pp. 96–105.

Above all, substitution of managerial and service activities for athletic and play activities may be damaging to the self-concept of individuals. Alert students are not "all head." They need physical and gregarious activities and those who avoid them most may need them most. Good teaching does not require constant participation in every activity regardless of level but it does provide a range of activities and gentle encouragement for each student to participate at some point.

Foreign Language

A modern foreign language has commonly been introduced as an extra experience in enrichment programs. This practice is comparatively venerable in programs for the education of gifted elementary children. Elementary children used French effectively in dramatization and in conversation in the early days of the Cleveland program. Goddard noted that his only objection to the performance of the children was that they spoke more rapidly than he could understand! [21]

The introduction of additional experiences is ordinarily made to augment the normal pace and standards which are not designed to excite the full activity of well-endowed children. It is generally presumed that any interesting and constructive activity will help to preserve an eager learning attitude and avoid the development of unpleasant or wasteful habits. A foreign language fills this vacuum while serving other purposes. It is commonly proposed that modern diplomatic, commercial, and cultural life can be enriched by learning languages. Young gifted children learn this communication effectively and rapidly. Able elementary students are fascinated by the study of language and proud of their accomplishment in it. They have time to spare and with their natural persistence may be expected to master reasonable expression in the language. They are flexible and uninhibited enough to learn to speak it properly.

Opposition to the introduction of a foreign language is sometimes based on the proposition that a language not studied to a high degree of perfection will not function well and is likely to be lost. It would be expected that in some cases instruction would be inadequate and piecemeal and very little permanence of learning could take place. It may be on this basis that 15 per cent of the former graduates from the Cleveland Major Work classes rejected a foreign language as part of a desirable curriculum in the elementary grades.[22] If the gifted child studies one language as a special activity for three years in the higher elementary or in the junior high school this fault of shallowness may be avoided.

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[21] Henry Herbert Goddard, *School Training of Gifted Children,* Yonkers-on-Hudson, World Book Co., 1928, p. 10.

Several authorities recommend the introduction of a foreign language when possible. This experience provides one of the easiest transitions to special sections or special classes. It may be introduced as a special interest group, which is the case in the Portland program. It also fits easily into the curriculum for the special class or it may be introduced as enrichment supplementing a unit of work as has been the case in Los Angeles.[23] The learning approach has been one of conversation, singing, and dramatic experience first, with formal grammar and vocabulary drill deferred. This type of experience is more enjoyable and is at the same time more positive and functional since language is learned in conjunction with the broadening of horizons and cultural interests.

French has been the language most commonly taught. However, in Los Angeles both French and Spanish are introduced and various schools have taught German. It is probable that the most common practice is to introduce a language with considerable local appeal and to consider it as the first of two foreign languages to be learned prior to college entrance. It is generally assumed that the first language need not be one of the so-called scientific languages. This point of view is not universally accepted and there is some support for the introduction of the international scientific language *Scienta Interlingua*.[24] This proposal is backed by the assumption that most gifted children will eventually take roles which are enriched through ability to discuss scientific ideas with scientists from anywhere. From a practical point of view, learning one of the modern languages seems to provide the greater extension of both scientific and cultural contact.

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[22] Norma E. Cutts and Nicholas Moseley, *Bright Children, A Guide for Parents*, New York, G. P. Putnam's Sons, 1953, p. 134.

[23] Robert J. Havighurst, Eugene Stivers, and Robert F. DeHaan, *A Survey of the Education of Gifted Children*, Supplementary Educational Monographs, Chicago, Illinois, University of Chicago Press, No. 83, November 1955, p. 40.

[24] Guy Chapman, "The Gifted Child and Interlingua," *Progressive Education*, 39, No. 4, July 1956, p. 110.

Philosophy

Human achievements depend on ability to classify and unify experience, ability to detect evidence, and ability to hypothesize. Meaning is central to truly higher process functions. Though many activities reflect a lack of thought and an abundance of emotion, social realism demands an effort toward the improvement of thinking and problem-solving.

The anxieties and complexities of modern life highlight the need for wisdom as well as for information. Educators have deplored isolation and specialization which lead to one-sided development. Frequently they point out that many seemingly brilliant college-trained men have been socially and politically naive. This may be an indication that accumulative education fails to equip men to think and to discriminate.

A concern for philosophy as an overriding objective in formal education has been expressed by Alfred North Whitehead as follows:

> The fading of ideals is sad evidence of the defeat of human endeavor. In the schools of antiquity philosophers aspired to impart wisdom, in modern colleges our humbler aim is to teach subjects. The drop from the divine wisdom, which was the goal of the ancients, to text-book knowledge of subjects, which is achieved by the moderns, marks an educational failure, sustained through the ages. I am not maintaining that in the practice of education the ancients were more successful than ourselves. You have only to read Lucian, and to note his satiric dramatizations of the pretentious claims of philosophers, to see that in this respect the ancients can boast over us no superiority. My point is that, at the dawn of our European civilization, men started with the full ideals which should inspire education, and that gradually our ideals have sunk to square with our practice.
>
> But when ideals have sunk to the level of practice, the result is stagnation. In particular, so long as we conceive intellectual educa-

> tion as merely consisting in the acquirement of mechanical mental aptitudes, and of formulated statements of useful truths, there can be no progress; though there will be much activity, amid aimless rearrangement of syllabuses, in the fruitless endeavor to dodge the inevitable lack of time. We must take it as an unavoidable fact, that God has so made the world that there are more topics desirable for knowledge than any one person can possibly acquire. It is hopeless to approach the problem by the way of the enumeration of subjects which every one ought to have mastered. There are too many of them, all with excellent title-deeds. Perhaps, after all, this plethora of material is fortunate; for the world is made interesting by a delightful ignorance of important truths. What I am anxious to impress on you is that though knowledge is one chief aim of intellectual education, there is another ingredient, vaguer but greater, and more dominating in its importance. The ancients called it "wisdom." You cannot be wise without some basis of knowledge; but you may easily acquire knowledge and remain bare of wisdom.[25]

The growth of judgment and wisdom is hindered by undue respect for group conclusions, too great attention to the immediate usefulness of learning, fragmented and specialized curricula, text-tied courses, and the belief that philosophy is something acquired late in life after all the facts are known.

Strong conformism conflicts with critical judgment and wisdom with a reduction in the self-confidence which has characterized the intellectual contributor through the ages. Gifted students must learn respect for group rights and group authority without accepting the infallibility of majorities. Human life would be greatly impoverished if only the common experiences and the common insights were valued. Such a course would confine social, political, scientific, or other action to simple proposals, to readily advertised outcomes, and to nearly resolved ideas. Overdeveloped needs for acceptance may lead the gifted child to reject contemplative and intellectual pursuits and favor short-term goals where the outcomes seem particularly valuable in an active and changing world. The school too may choose to stress social amenities and vocational preparation partly out of conforming to the cultural pattern and partly because outcomes in skill, in social habits, or in manipulating business machines are more readily demonstrated and likely to convince the consumer that things are being accomplished. It appears that adults must value and support some learning enterprises which are marked by abstraction, not practicality, by challenge, not probability of conclusion, by vagueness, not adhesion to a detailed assignment, by independent interest, not class enthusiasm, and by conflicting conclusions, not those suggested in a text. All this does not mean that the gifted child should be encouraged in rebellion nor taught to disregard common values, but taught rather to be at home with speculation and complexity and occupied with meaning, not just with popularity.

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[25] Alfred North Whitehead, *The Aims of Education and Other Essays,* New York, The Macmillan Co., 1929, pp. 45–46.

The demand for Sputnik builders and military technologists could reduce intellectualism and diminish the valuation of ideas. Dael Wolfle, Administrative Secretary of the American Association for the Advancement of Science, recognizes that there is a temptation to limit teaching to practical information when a field such as science seems to be so immediately useful. Under these pressures science teachers become overinvolved in explaining, evaluating, and criticizing, and neglect the development of thought. Wolfle rejects the idea that this limitation is inherent in scientific material itself, and he proposes instruction which seeks depth of understanding and includes a concern with the "why" as well as the "what." Even more, he is a vigorous proponent of the idea that science offers unequaled potentialities in the development of reasoning.[26]

Science instruction for gifted students should encourage reasoning and questioning and should discourage dependence on conclusions which are drawn from copying or from bias. It is probable that the value of science education lies in increasing the ability to adapt oneself to immediate empirical conditions of life. Effective science is not compartmentalized and insulated from other knowledge nor is it acquired in courses which only analyze and fragmentize. Science instruction for gifted students should provide—certainly not reduce—the opportunity to develop a unitary picture of all the facts in the curriculum.

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[26] Dael Wolfle, "A Long-Term View of Liberal Education in the Light of Manpower Needs," *Selection and Guidance of Gifted Students for National Survival* (Arthur E. Traxler, Ed.), A report of the 20th Educational Conference, held in New York City, October 27–28, 1955, under the auspices of the Educational Records Bureau and the American Council on Education, Washington, D.C., American Council on Education, 1956, pp. 11–22.

It is commonly proposed that the philosophic and critical judgment outcomes would be more adequate if schools should avoid abnormal emphasis on either specialization or artificial segmentation of courses. Core programs and integrated courses seek to avoid sterility in learning and may be particularly suited to gifted students whose need to make whole or make sense is consistently noticed regardless of educational level. Recently a college junior deplored her own inability to select among academic interests.[27] From a unified course she discovered the unity of intellectual and imaginative experience and was able to choose a major without rejecting other interests.

Closely related to the struggle against segmentation and truncation are positive attempts to assist the pupil in synthesizing the material in reference to his own experience. Integrative outcomes have been predominant concerns in many general education proposals. These outcomes appear to be dependent on both subject matter and learning process. The issue is not just what is learned but how it is learned. Some proponents have argued that critical thinking might well become the center or the prime objective of the whole business of education.[28] This is a proposal for a broad conception of critical thinking, not to be taught by formula, but to underlie the whole of the educational experience.

General education with central objectives of critical judgment and reasoning is most often proposed for the college but is probably as frequently achieved in elementary school. The early appearance, persistence, and stability of thought patterns previously remarked suggest that the delay of these objectives to the college level may assure that they will never be achieved. Clifton Fadiman has suggested that the ideal student of philosophy is a child from eight to twelve.[29] He feels that the American child is carefully guarded from considering problems of philosophy and that as an adult he tends to perpetuate an inability for generalized reflection. Fadiman holds that this philosophic inability is demonstrated by the fact that adult conversation continues to be at the gossip and news exchange level. We have noted that the middle elementary years called the "latency period" are marked by emotional calm and intellectual activity. During this time children are interested in abstract questions and filled with wonders about the world. Teachers have used this interest and social enthusiasm to examine the meaning and consequences of scientific and historical information, and it seems that the gifted child can benefit from problem-solving and judgmental opportunities at this age.

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[27] Gloria Rock, "Intellectual Autobiography of an Honor Student," *The Superior Student*, 1, No. 1, April 1958, p. 12.

[28] Paul L. Dressel and Lewis B. Mayhew, *General Education Explorations in Evaluation; The Final Report of the Cooperative Study of Evaluation in General Education of the American Council on Education*, Washington, D.C., American Council on Education, 1954, pp. 272–277.

[29] Clifton Fadiman, "Maybe This is a Crackpot Idea," *The Instructor*, January 1957, p. 42.

The problem attack is a natural method for gifted children since it is one of the applications of leap-and-check or hypothesis-test learning. The child begins with a question which impinges upon him. He sets up a hypothesis and begins to test it. Should that break down he goes back to establish a new hypothesis. The process may be illustrated through some thinking aloud done by Pete when he was just five years old. In a conversation with his mother he began, "If God is all around you, you know what I think He is, He's probably your shadow—and you can see only the part of Him where the sun isn't shining. Maybe He's just imagination. How can He take a seed and make a tree out of it? What I believe about making a seed is that He has some special kind of strength. He has strength enough . . . it's a kind of magic. He's a magic man. He has to have magic."

After a considerable pause, Pete continued, "If there weren't anything, God couldn't be alive because He'd just fall down but God is holding our world up with gravity which is a kind of magic. He can't be on this world because He has to keep it spinning with His string."

Another pause and Pete undertook the subject again with a question, "Do you know one thing else? God made Santa Claus!"

The thinking pattern of childhood marks the thinking of the man. Methods for increasing critical thought or the philosophic approach are not well understood but characteristic conditions can be identified. In part, these are conditions which accentuate the normal characteristics of intellectually gifted children. Writers advocate instruction which capitalizes on common sense, breadth of interests, sense of humor, and self-criticism.[30] Success in developing wisdom and critical thought requires emphasis on skills of reading and communication for these broaden interest and make possible the economic examination of ideas. The success is enhanced by opportunities for problem-solving and evaluating where the learner is viewed as an active and responsible agent in his own education.

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[30] See W. E. Herriott, "Modifying Technique of Instruction for Gifted Children," *University of Illinois Bulletin*, Urbana, Illinois, University of Illinois, 23, No. 18, January 1926, pp. 7–8 and W. A. Verburg, "Reflections on Educating the Gifted," *Educational Leadership*, 13, No. 4, January 1956, pp. 206–208.

Clearly these outcomes may be discouraged. They are discouraged when the student is overdirected, oversheltered, or deprived of contact with complex ideas or technical equipment. They are discouraged by rejection or overprotection for in either case the child views himself as one who cannot be both independent and accepted. Acceptance frees the child to explore. Active learners test out many solutions which are wide of the mark. They are squelched by adults who cannot accept mistakes involved in the process of learning. The Socratic form of teaching has been widely advocated and in some cases used successfully, but it fails when the adult aggressively demands a defense for each statement or idea.

Discussions with representatives of the adult world provide a specially valuable opportunity to function at high levels. Ideally the child withdraws from the active accumulation of facts in order to reconsider those he has learned and use them in new situations and with new meanings. On these occasions the child should be encouraged less to demonstrate the many pieces of his knowledge than to assemble these with uniqueness and consistency.

All topics or all subjects are not equally useful in the development of a philosophic attitude. There has been a recent tendency to discard "problems" courses in the social studies in favor of more traditionally organized courses. This may decrease scholarship. The strength of integrated courses has been in their psychological consistency or unity even when there were gaps in the subject matter. This integration or personal unity has especial value in studies which help the student acquire an accurate concept of himself or relate his thinking to that of others. If the subject matter of history or literature is treated in very repetitive and formalized fashion it is unlikely that children will relate its lessons to themselves or that they will apply it outside the school. Each succeeding level of perception or understanding imposes patterns on the earlier learning. For example, the college student who understands his first philosophy course is greatly altered but the student who only memorizes it is comparatively unaffected. The student is greatly changed by an appreciative contact with a great painting, by an empathic study of an historical era or by the critical examination of an essay. History, literature, dramatics, and economics are rather obvious source materials for the development of philosophic attitudes. However, mathematics and science so impinge on our times that they may not be excluded.

Hollingworth felt that schools could do little to produce abstract thinking in children with IQs below 130 regardless of age.[31] This seems unwarranted pessimism. Modern society requires that people of lesser ability shall be able to overcome their specialized preparation or their archaic wish for immediate popularity in order to criticize and integrate knowledge.

It appears unnecessary to introduce a subject called philosophy in the elementary or high school program but it is essential to introduce the philosophic view. The gifted student has a special need to understand the history of his society, to know the rules and principles of the society, and be sensitive to inconsistencies in practice. A philosophic approach to the study of literature, history, and science provides better avenues to these goals than does a formal study of philosophy. When the unity of subjects is emphasized, when the child is encouraged to bring insight from one subject to another and when the learner participates actively in discovering solutions and evaluating them there is opportunity for philosophic development. Well taught, such courses help provide both a structure of beliefs and the habits of critical thought.

Aesthetic Experience

Marked originality in aesthetics is correlated with superior general intelligence. A specific gifted child should not be expected to be truly creative in each of the arts but there is evidence that truly creative performance is common among intellectually superior children. Some authorities believe that children of moderate ability may copy and imitate, but lack the appreciation and imagination underlying truly original expression. Obviously, intellect and creative artistic ability are imperfectly correlated but the large conclusions from Terman's work include the fact that versatility and a variety of excellences are the rule with gifted children. The greatest superiorities are in abstract and logical performances but increments in intelligence also produce increases in artistic, musical, and aesthetic abilities. It is probable that this superiority arises from breadth of interest as much as from peculiar adeptness.

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[31] Hollingworth, *op. cit.*, p. 289.

The School Art League organized Saturday art classes in New York in 1924 and in a ten-year evaluation concluded that intellectually superior children showed "vivid imagination, great sensitivity to aesthetic expression, an absorbing interest in their creative work," and in general both tenacity and superior performance.[32] Similar intensity and ability were observed in the Hunter Elementary School.[33] Teachers observed that gifted children excelled in manual dexterity, were painstaking and original. They handled paint brushes, saws, and hammers with eagerness and with skill and the teachers recommended that these skills be acquired while the child's mind and muscles were highly plastic. It may be concluded that gifted children have impressive artistic possibilities and that these manifest themselves early.

It is difficult to determine just what part aesthetic and artistic experience should play in the education of the gifted. Some writers have attributed almost miraculous significance to these experiences.[34] They have proposed the study of music to reach goals which include socialization, intensification of feeling, arousal of sympathy, refinement of taste, the development of discrimination, habits of accuracy and care, ability for quick decision, the growth of ideals, a growth of readiness to subordinate oneself, co-operativeness as well as recreational skill, and technical excellence. Teachers with much less enthusiasm have held that aesthetic activities contributed to the recreational and cultural development of the individual, and at the same time assist in the maturing of personality. On the other hand a few writers have contended that artistic education leads to reckless antisocial personalities and to the functioning of a sly subconscious inner world which is not available to the ordinary inhibitions of education. These extreme positions are generally unacceptable. The outcomes of artistic experience are not all-embracing nor are they generally destructive of intellectual and social maturity.

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[32] Henry E. Fritz, "Art," *Educating Superior Students, op. cit.*, p. 3.

[33] Hildreth, *op. cit.*, pp. 63–66 and 125–129.

[34] Jeanette C. Berner, "Music," *Educating Superior Students, op. cit.*, pp. 244–279.

A most serious issue is the resolution of arguments over the degree of teachability in artistic functions. Some writers believe that these are natural proclivities little changed by educational experience. The poet A. E. Housman supposes that intellect does not produce poetry and may actually hinder its production. He further argues that the intellect does not recognize poetry and says, "Meaning is of the intellect, poetry is not." [35] Kipling felt that his daemon was in charge when he was most productive and that his finest work came when he did not try to think consciously but simply drifted and awakened and obeyed.[36] If the spirit invades some pens and refuses others then the nature and quality of artistic work is not likely to be altered by organized teaching. If talent is also viewed as inherited and unchangeable, the exclusion of artistic curricula should be expected.

More positive thinking is in order. One who is not observant, one who is anemic in thought, one who is deficient in memory or one who lacks courage to confront important human problems is not likely to produce truly artistic materials. Even should we agree that the creative act arises in some interchange or circulation of psychological energy between the conscious and the subconscious we must accept that dull or inexperienced children have little on which to build creativity. Artistic ideas sometimes seem to spring from casual and unwitting experience but they spring from a rich inner world which has been developed from some combination of intelligence and experience.

From his work on creativity, Gardner Murphy concludes that schools and homes can assist in freeing intelligence.[37] First they may help to solve or remove socially shared autisms or group self-deceptions, for these stand in the way of imagination. Then they can encourage curiosity which is a powerful motivation toward new ideas in contact with the outside world. Third, parents and teachers should provide opportunity for relaxation and dreaming which are necessary to artistic development. It is not at the highest pitch of alertness where illumination occurs. When the mind is freed from pressure, more clues, and more unusual clues, can be woven into the total intellectual structure. At such a time, the individual introduces more personal variables and performs more individuated or creative acts. These are likely to be discouraged in our society which values being wide awake and alert. Most of all it is necessary to recognize that creativity does not arise simply from sharpened sensory responses. The culture which encourages artistry and imagination is the culture which provides the challenging idea.

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[35] A. E. Housman, "The Name and Nature of Poetry," *The Creative Process* (Brewster Ghiselin, Ed.), Berkeley, California, New American Library, University of California Press, 1955, p. 80.

[36] Rudyard Kipling, "Working Tools," *Something of Myself,* Garden City, New York, Doubleday, Doran & Co., Inc., 1937, pp. 225–227.

[37] Gardner Murphy, *Human Potentialities,* Part III, New York, Basic Books, Inc., 1958, pp. 111–194.

Nurturing societies help the child find the significance of his learning. They maintain a relevance between what the child does and his feelings or needs. The need to organize or to develop higher levels of understanding is encouraged. Associations or perceptions which have been operating at partly conscious or unconscious levels are brought into full meaning when they appear in the higher level of consciousness or understanding. This need to organize is essential to the new idea or creative act. It appears in science and in art and Gardner Murphy considers it a quality of all creativity.

In such views the problems of creativity are complex but not insoluble. The potentialities of the individual can be intentionally nurtured. Murphy feels that human nature itself is not fixed but can be further evolved both for the individual and for the group. Human nature is built around early and primitive drives. It springs from these but is not held to them. A preparation for artistic life is not a mere matter of developing the senses of freeing primitive drives. It is partly a matter of whetting the curiosity and providing an immersion in rich intellectual and emotional material. The greater motivations and the more flexible ones have in them large elements of intellectual function with capacity for dreams and discovery.

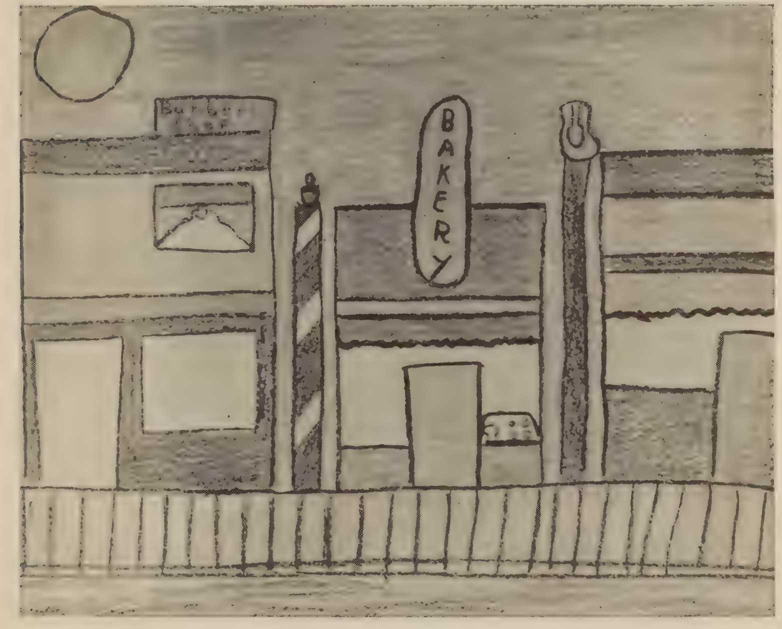
Artistic and creative processes can be partly explained and understood. They can be encouraged or taught. The process probably includes four steps. First, the teacher helps the child become thoroughly aware or sensitized to an area of knowledge. Sensitivity to the information is promoted by mildness and freedom in the learning so that the child may see the relation to himself, his family, and his culture. Sensitivity is less developed through highly controlled routine introduction to information because these conditions limit personal involvement or responsibility. When the learner has been thoroughly acquainted with a body of knowledge and feelings, the need to organize or make it more meaningful appears naturally but the teacher advances it by posing a challenging question or proposing a possible organization. In the third step the teacher plays a smaller part. This is the point most identifiable as creativity or artistry. At the point of illumination there is development of a finer pattern or a higher level of organization with the new product bringing the accumulation of experience into fuller contact with more remote experience. Following the height of the creative act there is a period of testing out or evaluating which includes the setting of new goals. Here the teacher plays a major role. When the creative act is seen in such reasonable terms, it is possible to study the act itself and the means of encouraging it. Teaching for artistic outcomes becomes more possible and can be approached on a more understandable basis.

The significance of experience and the function of teaching in the enrichment of experience is illustrated in an incident concerning Kathy. During the spring, the teacher knew that Kathy would spend a few days in an area where tulips are raised commercially. She encouraged Kathy to visit a large field of tulips so that she might tell the class about it on her return. The teacher particularly suggested that Kathy discover which parts of the farming were hand operations and who did these tasks. Then she suggested that Kathy try and find out where the bulbs went after digging. Finally, the teacher encouraged an artistic response by suggesting that Kathy should look particularly for the flash of colors in the sun and for the wavelike ripple of colors in the wind. This preparation increased the anticipation for the adventure and sharpened Kathy's observation while in the field. It increased her sensitivity—to both sense experience and more formal information. Her report to the class was enthusiastic and the children responded with interest. They decided that, on the following day, they would dramatize a field of tulips with each child portraying a single brilliant, graceful tulip. On that day, Kathy was prepared with the following poem:

I smile at the sun
So warm and so bright.
I dance with the wind
From morn until night.

I curt'sy and dip
In my red dress so bright.
I don't take it off
Because I dance all night.

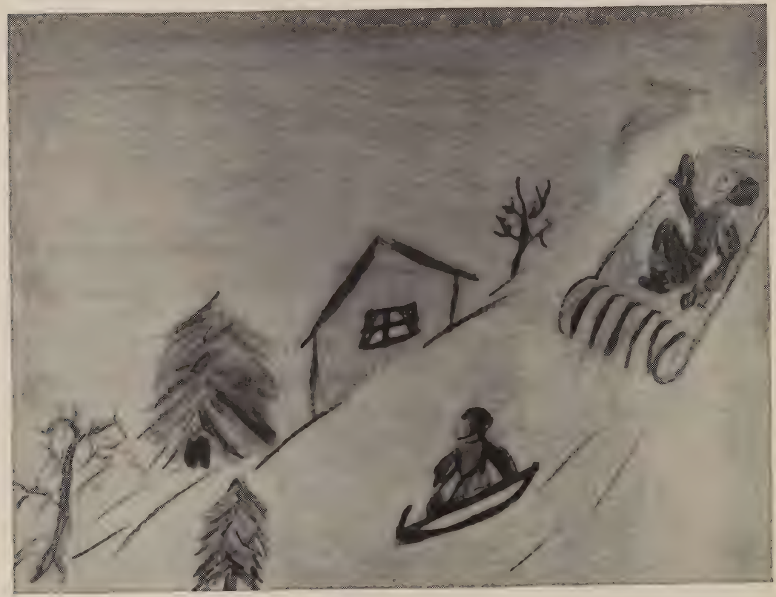
Memory is an important characteristic of truly creative performance. Poets, musicians, and artists retain sense impressions with accuracy and with some of their original freshness. Wordsworth pointed out that every image used in his poems was one which had been observed at some previous time in his life. It is probable that apes and other very complex animals are less ingenious and less creative than man in part because their memory is short. Memory is essential to perpetuate experience so that the elements of a new situation may be combined with it in an artistic or creative fashion. Through memory the meaning of experience is increased and this results in increased sensitivity or high affectability.



"Our Town"—Nancy

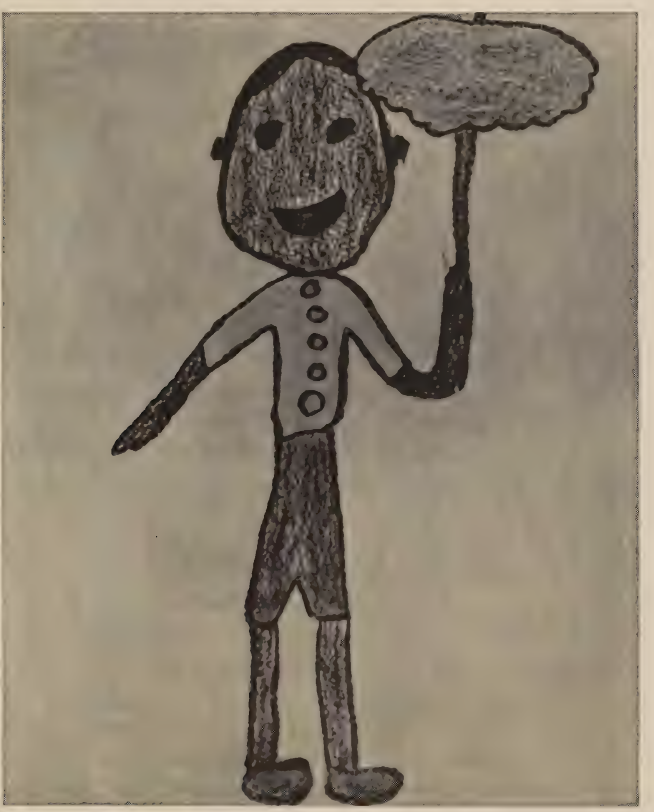
Gifted children can be taught to be keen observers and to use their observations in creative ways. In Nancy's drawing of "Our Town," which is reproduced here, one can detect the accuracy of her observations through the precise reproduction possible only for an able child.

Anyone familiar with prairie hamlets will recognize the squared false-fronts, the living quarters above the store, the two-panel curtain, the barber pole, and the boardwalk. Yet Nancy has gone beyond simple reproduction to add the sun and the cloud as well as a coat of brilliant colors. The ability to suggest feeling in a well-known subject is even more clearly shown in the drawing "Winter Scene." This work has considerable accuracy and catches some of the verve and excitement which marks play on a cold snowy afternoon.



"Winter Scene"—Nancy

The educational role in providing experience as background for the inventive and creative act is readily seen. Regardless of the energy and originality of the mind it is impossible to create without excellent mastery of the field in which the art is placed. In order to promote artistic development it seems necessary to immerse the child so that he will have both the memories and skills which underlie his own creativity. Appreciation seems to contribute to this purpose and at the same time provide for an artistic experience. The child who has a significant encounter with a painting, a poem or an opera is probably as truly affected and permanently affected as one who grasps a scientific principle or one who senses the significance of an historical incident. In either case growth is enhanced by acquaintance with the traditions and excited participation in the meanings or values as these were seen by author or inventor. Appreciation studies also provide bench marks for the evaluative phase but should contribute most in the initial stages of artistic projects.



"Little Black Sambo"—Kathy

A study of Kathy's drawing "Little Black Sambo" indicates that technical skill is important and satisfying to the child. She attempts to include hand details, hair, and buttons. She uses colors suggested in the story and tries to make the umbrella a reasonably accurate representation by drawing a scalloped edge, a cane head, and a point protruding through the fabric. While this drawing is representational, the skills involved and the self-satisfaction which accrues encourage the child to continue in creative activity. While effective teaching does not place technical knowledge or drawing skill as a goal above appreciation or imagination, it does not ignore and devalue such skills.

The desirable school situation includes many opportunities to react emotionally to musical and artistic materials. These experiences heighten artistic enjoyment and help the children understand feelings which may find later expression. Nancy was delighted with the poem "Fog" written by Carl Sandburg. She requested that it should be read again and then she was encouraged to discuss how she felt. She was delighted with Sandburg's analogy. She liked the idea of gray fog coming on little cat feet. She discussed how it came quietly and smoothly and how, unlike the dark, it came from one direction at a time. She found it a little frightening, too, because you could not stop its coming and because you could get lost in fog, and because you could be on the street and no one would know that you were there. Several weeks later Nancy wrote the following poem. It is clearly indebted to Carl Sandburg and it probably would never have been produced if the child had been shamed by her feelings or if she had not been encouraged to discuss her reactions to the poem "Fog."

Dark

Darkness is black and cold.

It hides in shadows behind the house and hill.
Then while you turn away it comes beside you.

When darkness doesn't hide
You'd better be inside!

The acculturation period, in which the teacher plays a large part, is not one which shows large measurable gains. The most promising course seems to be that of offering a rich flexible program with opportunities for each child to select or choose. Although one child may be modeling, another painting, and a third constructing in paper, the activities are not directionless for the teacher provides constant encouragement with opportunity to share artistic experience, to learn new techniques, and to evaluate one's own work.

Originality is characterized by newness. The product expresses some individual perception or some individual relationship to a common environment. The mode of expression is frequently like the analogy or metaphor with a special capacity to express the unique or unusual observation. The imaginative or inventive product involves a previously hidden relationship. Teaching which elicits these expressions is ordinarily encouraging and permissive. Newness also includes elements of failure and is not characteristic of a success-oriented situation. The successful teacher encourages self-evaluation, helps the student recall, helps him discriminate shades of meaning or helps him face the differences between the expression and the vision. She does not overcorrect, redraw, or require that the work shall be repeated to reach a specified level of perfection.

It appears that rigid requirements for exactness are particularly inhibiting in artistic work. Children enjoy success in the technical aspects of any work but great emphasis on these reduces perceptual growth. Continued attempts to secure perfect correspondence between expression and senses seem to limit the effect of the mind's eye. Art instruction is notable for the belief that good performance is not simply mechanical but distinguished by personal vision or personal aim which controls the outer medium.[38]

Creative writing, debating and dramatics

Fertility of thought, ability to perceive universals, and mature verbalism find natural confluence in creative verbal activity. Gifted children build new forms for common ideas. They make extensive use of analogy and metaphor and they select distinctive expression. Their own affectability and pervasive awareness encourage acute differentiation of meaning, appropriate organization, and carefully selected vocabulary.

Schools are dedicated to the development of at least minimum standards for all children and this may promote conformity. The ordinary and practical tools of expression such as those required in business English may be an appropriate upper limit of expectation for many children in the regular classroom; efforts to meet these standards limit the attention given to truly original ideas, new arrangements of observation, or extensive vocabulary. Expressive opportunities are most frequently offered in (*a*) creative and imaginative writing, (*b*) debating, taught to produce originality and judgment rather than oratorical practice, or (*c*) dramatics taught creatively to discover the feelings of characters and the inventiveness of actors.

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[38] Viktor Lowenfeld, *Creative and Mental Growth*, New York, The Macmillan Co., 1947 (revised 1952), p. 45.

Highly intelligent children are quite superior in creative language. In the Stanford studies, teachers rated the gifted sample as most superior over control children in debating and speaking.[39] Other subjects in which they demonstrated marked superiority required verbal and organizational ability. These include American history, composition, literature, ancient history, grammar, and general science. The teachers estimate that their minimum accelerations were in subjects such as physical training, sewing, drawing, modeling, penmanship, manual training, painting, shop work, games, and sports.

Creative vocalizing comes early for gifted children for they are filled with imagination and pleased with the interchange of ideas. They turn a key to start themselves, create an invisible companion to correct their mistakes, or indulge in other fanciful and creative pursuits. In an approving and accepting environment they develop a reservoir of creative behavior before teenage inhibitions or a desire for conformity are incurred. In some cases parental unwillingness to share in early fanciful play may be a major factor in slowing creative growth. The adults may directly repress imagination, but more commonly they require children to express adult reactions and adult ideas, rather than encouraging impressions and expressions which are suited to the learner's development level. Such demands prove unproductive because children cannot observe as adults do, they cannot recognize the feelings involved, and they do not perceive themselves as significant or involved in these activities.

Creative language or other creative expressions most frequently arise from material which is within the student's real or imagined experience when he is free to choose both the material and the means of expression. Children select materials out of their experience, materials which are appropriate to their development and materials which have a fascination for them at this point in life. In the spring of her first year in a rural school on the plains, Nancy wrote a story about the gopher.

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[39] Terman *et al., Mental and Physical Traits of a Thousand Gifted Children, op. cit.*, p. 261.

Gopher

A gopher lives underground. A gopher eats vegetables but no meat. He sleeps all winter and comes out in the spring looking for food. The farmer does not like the gopher.

Children repeat worn out themes and reuse old expressions. Frequently these repetitions provide for more exploration of ideas and for the firm establishment of vocabularies. Two poems written by an eight-year-old boy use a common subject matter, a single gimmick or trick, and are much alike in organization and in poetic structure. This similarity from one poem to the next does not indicate that the following are not an imaginative experience for the young author.

Trotty the Pony

Trotty, the pony, and I have fun,
He likes to gallop and I like to run,
He kicks his heels high and jumps over the fence,
It seems like a pony would have more sense.
When people walk by him, they all turn to look
It's a shame that he lives inside a book.

Leslie Felt

Where Am I

I see a horse out at play
And stars are there in number,
Weeds grow among the anemones
And there's green cucumber.

I bet you think I'm on a farm,
At least, the scene is rural
But these are things we drew at school
And put on our underseas mural

Leslie Felt

Creativity in language is elicited more by the method of presentation than by the specific nature of the activity. The child needs experience in elaborating his unique interpretations of the world in ways which delight his readers and himself. This is not accomplished by reproducing or copying though these may not always interfere. Creative expression may be encouraged in day-to-day teaching, assembly programs, or intermission fun. "Putting on a play" in which the child is led to examine the story, sympathize with the feelings, invent settings, and interpret may be a highly creative activity. On the other hand "putting on a play" may have limited value if the teacher selects the play, interprets the parts, and requires that the student imitate that interpretation.

Creative methods do not confine dramatic experience to organized dramatics, class plays, or assemblies. Gifted children learn well through social studies assignments which require them to develop an imaginary dialogue between Plato and John Dewey, between Lincoln and Gandhi, or between a displaced child in Hungary and a delinquent child in New York.

Truly creative language activities like other aesthetic experiences draw on memory, encourage enjoyment of artistic work, and provide for the expression of genuine feeling. They do not result simply because a class is set aside to work toward that end. Excellent teachers allow each child to select from real experience and from genuine interest those aspects which are most fascinating to him. They encourage the development of creative language in every class though they may emphasize it particularly in literature, debating, and dramatics. In all cases they accept simple beginnings, approve imperfect but ingenious efforts, and create continuous satisfactions. Under these conditions any subject matter provides appropriate development of creative speech and writing.

One of Nancy's stories, which appears below, is a good example of the efforts made by a sensitive gifted child. The following story is marked by unity and coherence. No significant element is missed and nothing is introduced which does not lend color or vital information to the whole story. She enjoys fantasy but is able to maintain a sense of reality and plausibility. This simple plausibility is maintained by the humanness of the characters and by the credibilty of the conversation. The elf refers his doubts to the adults and Santa Claus refers his problems to his wife. The author makes Santa very human. Santa does not accept Mrs. Santa's conclusion and continues to ponder the problem until it is solved.

The writer demonstrates a rather genuine sympathy with the characters in her story. This sympathy is most apparent in the happy ending but is also demonstrated through the mother's sympathetic attitude toward her child's inability, through the genuine warmth in the human family, and through the family-like group at the North Pole. An example of Nancy's sympathy is shown by her inability to describe the cupboard as absolutely bare. Nevertheless, this sympathy is not maudlin. It reveals an element of maturity for Nancy recognizes that the welfare of the whole group cannot be sacrificed for one. The Christmas operation must proceed whatever the unpleasant consequences for Jackie. The organized wholeness, the total plausibility, and the genuine sympathy are overriding characteristics which make this work creative beyond the requirements of reasonable accuracy and grammatical correctness. Nancy has drawn on imaginative and actual experience as well as technical skill to write a truly creative story.

A Jumboknitsweater

Once upon a time in Santa's workshop there was an elf named Zippo. Now Zippo was one of the busiest elves in Santa's workshop.

One day Zippo was looking over Santa's list of toys when he saw one little boy who wanted—!!! Zippo couldn't make out that word. Zippo never saw a word like that before so he said, "I'll go ask Santa if he knows what it is." So away went Zippo to ask Santa Claus if he knew what the word was.

When Zippo got to where Santa was working he said to Santa, "Santa Claus do you know what this word is?"

But Santa shook his head, and replied, "Zippo I have never seen a word like that."

Zippo said to Santa, "But Santa then some little boy won't get what he wants for Christmas."

"Yes, and that would be a bad record wouldn't it," Santa replied thoughtfully. "We better ask Mrs. Santa Claus."

When Mrs. Santa saw it she said, "It is from Jackie Blenden. Santa do you know any boy by that name?" asked Mrs. Santa.

"Well now I don't think I do, but if Zippo will get me my list of names I will see."

Away ran Zippo to get Santa's list. When he gave it to Santa he said, "it will be quite a while won't it."

"Yes, it will," Santa agreed. So you can go back to your work. Come back in about ½ an hour."

So Zippo went back to his work but he kept glancing at the clock. He thought the time was going slowly. Finally ½ an hour went by. Zippo hurried back to Santa.

When he got to Santa he asked, "Did you find his name?"

"No! I didn't Zippo and I don't know what to do." "Now what would you do Zippo"

"I don't know," replied Zippo. "Just what will we do?"

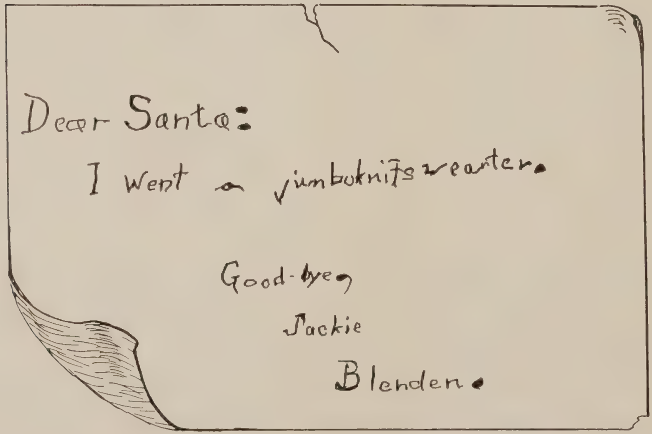
"I guess we will have to keep on making toys any way, don't we," questioned Santa.

"Yes we will. We couldn't make all the children unhappy because of one boy," answered Zippo.

Well we had better get to work Zippo.

Santa became more worried and more concerned each day. But he still could not make out the big word.

Now it was Christmas Eve. Santa had the letter with him. This is what the letter looked like.



Dear Santa:

I went a jumboknitsweater.

Good-bye,

Jackie

Blenden.

When Zippo and Santa got into the sleigh they were feeling very sad. Next tears came into Santa's eyes.

When they came to one house where a boy wanted a jumbo sweater they found another note saying he wanted a teddy instead. Zippo looked and found an extra teddy bear. "But," said Santa, "Who will want a big sweater like this?"

"Oh maybe someone will," answered Zippo.

Then they got into the sleigh and rode off. When they were flying over a big woods they saw a column of smoke as if coming from a chimney. "Maybe it is another house," said Santa to Zippo. "But I was never here before.

When they got to the place they found it was a poor house on a hill. It belonged to a very poor man named Johnathan Blenden. Santa went down the chimney with Zippo. When they got down the chimney there before their eyes was a sorry sight. There was one big room with a stove one big bed and in the bed was a boy. There were also 3 or 4 chairs, a table. And a cupboard with some kettles, dishes and quite a bit of food in it. Sitting on 2 chairs were a mother and a father. Santa Claus asked, "Are you Mr. and Mrs. Blenden and is this your boy Jackie?"

"Yes we are," they said. "Our little boy Jackie wants a jumbo sweater we can't afford to get one for him.

"Do you know if Jackie sent me this letter?" asked Santa.

"It looks like his," answered Mrs. Blenden. You see I didn't know what he had done until he had sent it. If I had I would have shown him how. But we had just a little paper left and he couldn't use that. I knew you wouldn't know what he asked for but we thought you might bring him something."

"Well I can fix that," smiled Santa "I have one right here. Did he hang his stocking?"

"Oh yes! he did," answered Mrs. Blenden. "I have one right here."

While Santa filled Jackie's stocking he talked to Mrs. Blenden. He asked, "Have you a Christmas tree?"

"Yes I found one in the woods, answered Mrs. Blenden. "But we don't have any decorations to put on it!"

"Santa, we have 2 boxes of decorations in the sleigh, shall I go and get them?" asked Zippo.

"Yes, go answered Santa, we will decorate the tree. Won't that be fun?"

"Yes it will," answered Zippo. Away went Zippo to get the decorations.

Mr. and Mrs. Blenden couldn't believe their eyes when they saw the tree.

When Johnathan & Maida & Jackie woke up they saw not one parcel under the tree but 12 parcels under the tree, also a turkey and everything to go with it. What fun they had that Christmas. Jackie got up and put on the sweater, he went right outside. How he liked his sweater.

That Christmas there were 5 people happy. They were Jackie, Johnathan, Maida, Santa and Zippo.

Summary

In general, high ability makes it appropriate to set high standards and to set difficult problems though surely the difficulty should be in the problem and not in the teacher or the school routine. Technical sophistication and accuracy should be expected. When the learning merits permanence in its present form it is appropriate to use drill and rote methods.

Successful teachers recognize that age standards and common assignments decrease in value with intellectual increments. Gifted pupils with their ability to interpret and integrate observations and with intense and durable interests are "naturals" for methods which include individuation through differential assignments and through laboratory approaches. Meaning is central in educational purpose and skilled teachers know that meaning is acquired when the student is responsibly involved.

There have been advocates of programs in which no extracurricular activities would engage the teacher's time and few social activities would be available to the students.[40] The alternate view holds that the truly gifted person should have broadening experience. A cautious view precludes the choosing of objectives which are too narrow or which ignore aspects of the environment other than the purely academic disciplines. A decision to limit experience always involves a grave ethical responsibility and it appears that narrow experience may produce the bright adult who is merely informed, neither wise, socially conscious, nor personally happy. The active interests associated with high intelligence cause children to have wide-ranging enthusiasm for games, foreign language, reading, painting, music, and social activities. These experiences contribute to the accuracy of knowledge and to the development of responsibility. The gifted child should participate in school affairs, attempt to express himself in debating or art, and enjoy having one of his poems read in class.

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[40] H. G. Rickover, "Let's Stop Wasting Our Greatest Resource," *Saturday Evening Post*, 229, No. 35, March 2, 1957, p. 19, and H. C. McKown, "School Activities and the Gifted Child," *Education*, 79, No. 1, September 1958, pp. 12–16.

The nurturing atmosphere for philosophic and creative thought involves individuation, and artistic activity demands an atmosphere that is flexible, encouraging, and emotionally secure. Creative and inventive responses are marked by newness and variation. They are elicited in an atmosphere of psychological safety in which the learner is accepted and encouraged to try. This climate is comparatively free of external evaluation or of punishment which the child does not understand. The child is encouraged to evaluate his own effort and to use this evaluation as a starting point calling for the resetting of goals, the redefinition of problems, and the reorganization of what is known.

12

Mathematics and Language Arts

The development of competence requires thorough acquaintance with academic disciplines or fields of knowledge. In February, 1958, the National Education Association with a grant from Carnegie Corporation convened a meeting of 200, mostly educators, under the chairmanship of James B. Conant. A report from the two-and-a-half day meeting places strong emphasis on standard academic subject matters.[1] The majority of educators will concur with this emphasis though they may fear that implementation of the recommendations would severely limit the possibilities for broad experience. They are most likely to dispute the course classifications and the proportionate time allocated to various subjects.

Recently there has been a deplorable tendency to call some courses "solids" and other courses "snaps." The basis for this distinction is not clear even to professionals and must result in lay evaluation of courses on the basis of bias more than on the basis of judgment. The courses at the top of the hierarchy tend to deal with traditional subject matter and especially subject matter which can be measured by exact standards. Memorizing arithmetic tables, learning a foreign language, or becoming acquainted with the facts of history are important achievements but cannot be listed among the most complex of intellectual tasks. Any course may be a snap and educators are not agreed on the relative weight which may be assigned any one field of learning.[2]

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[1] National Education Association, *The Identification and Education of the Academically Talented Student in the American Secondary School,* Washington, D.C., National Education Association, 1958, pp. 121–129.

[2] Herbert A. Tonne, "What is a 'Solid' Subject," *The Education Digest,* 24, No. 3, November 1958, pp. 42–43.

The Conant report recommends as basic requirements "for all academically talented students" the allotment of periods in modern language in a two-to-one ratio with science and in a five-to-three ratio with social studies. For those with "special abilities in the humanities" the recommended periods in modern language are three and a half times as many as those assigned to mathematics or science. While the values of modern languages are recognized, the relative value and the proper apportionment of time is debatable.

Agreement on the significance of academic activity is widespread. Gifted children recognize the personal or vocational values of academic courses and select them in larger degree than is required.[3] A study of superior children in the Indiana High School Achievement Program Contests shows that they select such courses as geometry, trigonometry, Latin, and chemistry. Their transcripts show a minimum of courses which are thought to be less rigorous. For example, the majority choose biology, chemistry, and physics while only a few select the reputedly easy courses in botany, electronics, geology, physical geography, and general science.

Mathematics

Mathematics is vital in the education of gifted children in an era of technology and automation. Even before earth satellites the rate of increase in demand for engineers was five times the rate of population increase. The rate for scientists was twice that for engineers. Those who will operate electronic brains, guided missiles, quality control, or involved banking systems must be skilled in the technical and computational aspects of mathematics. At least some of their peers must be competent in understanding mathematical science or quantitative thought. These capacities are essential to the study of modern science, philosophy, or sociology. Some gifted students need very specialized mathematical training; all gifted students need an excellent grasp of mathematical ideas.

Few subjects have been taught in a more textbound fashion and few have ever been re-examined with enthusiasm such as that now turned toward mathematics. The nature of needed modifications is not agreed but it is agreed that traditional instruction emphasized computational and process learning at the expense of better understanding and with the general result that students did not see mathematics as a tool of logic and discovery. Periodically, one hears that European methods or the older formalized instruction produced fine thinkers and well-disciplined minds but competent observation casts doubts on these judgments. A British educator who taught mathematics in American schools concluded that characteristic co-operation and friendliness between teacher and student sometimes leads to the belief that standards are low.[4] In his view, this friendly openness increases the vitality of interest but does not decrease the formality of the subject matter. In fact, he found American subject matter in mathematics more formal and more traditional than that in British schools. He further concluded that university requirements and the wide use of standardized testing produces a degree of uniformity near or equal to that attained through the central control in the British system.

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[3] Alice Miles Eagle and H. Robert Kinker, "Do Intellectually Superior Students Take Soft Courses," *Phi Delta Kappan*, 39, No. 9, June 1958, pp. 402–404.

The proposals for reform are divergent.[5] The Commission on Mathematics of the College Entrance Examination Board began a study of high school curricula in 1955. Their view is comparatively conservative with proposals to eliminate some outmoded material, alter algebra and trigonometry in some degree, make considerable changes in geometry, and add some upper level courses. Algebra would give greater attention to inequalities, include the "theory of sets," which is an important tool in modern mathematics, and be approached in a more abstract and deductive fashion. In geometry about seven-eighths of the usual theorems would be discarded in favor of more rapid and more practical methods. The time saved would make possible the inclusion of some solid geometry in the first year.

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[4] W. S. Brace, "An English Schoolmaster Looks at American Mathematics Teaching," *The Mathematics Teacher*, 49, No. 4, April 1956, pp. 241–249.

[5] For a discussion of these views see E. P. Rosenbaum, "The Teaching of Elementary Mathematics," *Scientific American*, 198, No. 5, May 1958, pp. 64–73, or Morris Kline, "The Status of Reform in the Mathematics Curriculum," *California Journal of Secondary Education*, 33, No. 7, November 1958, pp. 420–427. The plans of the Yale group are outlined in E. G. Begle, "The School Mathematics Study Group," *The Mathematics Teacher*, 51, No. 8, December 1958, pp. 616–618. The case against revision can be found in Morris Kline, "The Ancients Versus the Moderns, A New Battle of the Books," *The Mathematics Teacher*, 51, No. 6, October 1958, pp. 418–427. An answer is found in Albert E. Meder, "The Ancients Versus the Moderns—A Reply," *The Mathematics Teacher*, 51, No. 6, October 1958, pp. 428–433.

Another approach known as the Illinois Program is associated with Max Beberman from the University High School. With support from the Carnegie Corporation this program is being tried out in a number of schools with teachers who have had special preparation at the University of Illinois. The approach emphasizes discovery and generalization with early learning of axioms or principles. Children learn the difference between a number and the label or symbol used to represent it. They explore the idea of sets and participate in other abstract problems which are not necessarily tied to immediate vocational utility.

A group known as the Yale Group but active in several universities is also involved in evaluating modern curricula and teaching methods in mathematics. The interests of this group were supported by the American Mathematics Society, the Mathematical Association of America, and the National Council of Teachers of Mathematics. With the leadership of Professor E. G. Begle at Yale they secured funds from the National Science Foundation for a research and study group.

Both mathematicians and the public tend to believe that there is a need to vitalize mathematics teaching. They hope to reduce the gap between mathematical thought and the memorized kind of learning so common in this field. In general the reformulations would remove a limited amount of material which is more or less obsolete and would emphasize the conceptualizing or symbolic thinking of mathematics.

There is also opposition to the abstract and logical emphasis. Morris Kline, professor at New York University's Institute of Mathematical Sciences, argues that symbolic logic does not control thinking but follows from it. He is less ready to teach pure mathematics and argues that the new plans neglect the need for concrete experience before abstraction. He sees deductive or pure mathematics as a goal rather than as a point of approach.[6] Kline contends that modern mathematics, including symbolic logic, postulational system, Boolean algebra, set theory, and the like is overdifficult and meaningless for introduction in the high school and in the first year of college. He suspects that it is introduced because teachers and textbook writers are enthusiastic about it more than because it provides an effective approach. He believes that such topics are too distant from the thoughts, interests, and activities of students and he recommends, instead, increased naturalness and humanity on the part of the teacher and the textbook, with the introduction of mathematics made through a study of the physical world.

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[6] Morris Kline, "Mathematics Texts and Teachers: A Tirade," *The Mathematics Teacher*, 49, No. 3, March 1956, pp. 162–172.

New methods are being tried primarily at the secondary and the college level but they use many ideas which have been developed in elementary teaching and in creative subjects.[7] They discard teaching a rule and then applying it or teaching the rule as a summary of specifics and they favor "disçovery learning." The child may be asked to find the height of a tree from the length of its shadow. He finds that these are equal when the ground angle is 45 degrees but as the angle decreases, the ratio between the sides of the right triangle alter proportionately. He discovers "tangent" or "tan" without being told the rule or without having computed it formally. Learning is perceived as different from instruction and emphasis is put on encouraging the child to note similarities and differences or to make new applications. There is renewed emphasis on discovery, with the result that understanding is better and computational errors in later work are more readily perceived.

Attention is given to scientific development rather than to technological expertism with mathematicians less inclined to stress the computational and more inclined to value the development of a continuous system of an abstract nature. There is greater emphasis on the nature of number and on helping the student to solve problems using more intuitive and more personal organization. Increased attention is being given to method and to the improvement of teaching. This improvement has been stimulated through financial support from the National Science Foundation. The changes come in a period of rapidly increasing school population and an increasing shortage of mathematics teachers. The number graduating with advanced degrees is small and competition causes one third of those who are prepared as teachers to enter other occupations. The changes proposed would require better-trained teachers and smaller classes. Perhaps the popular concern with mathematics will make these goals achievable but the shortage of competent teachers must make it very difficult.

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[7] See H. C. Christofferson, "Creative Teaching in Mathematics," *The Mathematics Teacher,* 51, No. 7, November 1958, pp. 535–540, and Norton Levy, "Toward Discovery and Creativity," *The Mathematics Teacher,* 50, No. 1, January 1957, pp. 19–22. To evaluate some of the newer teaching materials see School Mathematics Study Group, *Experimental Units for Grades Seven and Eight,* New Haven, Connecticut, Yale University, 1959. With these materials there is a teachers guide. See also the various units and teachers editions of material from UICSM (University of Illinois Committee on School Mathematics), Urbana, Illinois, University High School.

Popularity of mathematics

In the face of military and industrial demands, until recently there has been a decreasing percentage of pupils enrolled in algebra and geometry in the secondary schools. In fact, there was a raw number decrease registering in geometry between 1934 and 1953.[8] A rather widespread dislike for high school mathematics reduced willingness to take courses which would prepare students for advanced specialized training. Approximately 10 per cent of high school students took the courses required to enter scientific fields prior to the recent pressures for "crash programs" in science. Though each student does not need trigonometry as a surveyor needs it, every able student needs to deal lucidly with ratios and space relationships. It is questionable whether or not students have been adequately prepared for modern times.

Competition with Soviet Russia highlighted this question. The able young Russian invests a great deal of time in mathematics. In grades one to four he spends 29 per cent of his time studying mathematics; in grades five to seven, 36 per cent; in grades eight to ten, 41 per cent. On the average he spends 35 per cent of the first ten school years on mathematics. Of those who graduate from college, 60 per cent are in engineering compared with about 25 per cent of Americans.[9] Obviously, "engineer" means something different in Russia—the engineers must frequently be merely technicians. Obviously, too, the Russian plan may be ill-advised or inappropriate.

The Soviet plan includes a large basic requirement in mathematics, regardless of vocational objective. Teachers are specially trained in

[8] Earl M. McWilliams and Kenneth E. Brown, *The Superior Pupil in Junior High School Mathematics*, Washington, D.C., U.S. Department of Health, Education and Welfare, Bulletin No. 4, 1955, pp. 1–2.

[9] Raymond J. Seeger, "Mathematical Science and the Manpower Problem," *The Mathematics Teacher*, 50, No. 1, January 1957, pp. 10–18.

courses deliberately oriented toward school mathematics with a good deal of emphasis on teaching methods. The intellectual community and published materials emphasize mathematics; both vocational opportunities and well-organized mathematics clubs encourage students to participate.[10]

The present American mood favors more mathematics. Typically, it is suggested that the first two years of high school should include algebra and plane geometry with the third year devoted to intermediate algebra and trigonometry and the fourth year offering college algebra and analytical geometry. The recommended motivations include scholarships, scrolls, medals, and competition.[11] It has even been proposed that interest in mathematics should be cultivated just like an interest in athletics. Some mathematics teachers feel that competitive motivations have been unpopular simply because the average teacher is protective of the less well-endowed student. They rarely suspect that these motivations may interfere with the fullest development of the gifted. Their proposals are well intentioned but ill-advised because vigorous competition narrows the range of experience and most mathematical programs are already too narrow for gifted children. Furthermore, competition emphasizes computation and polished behavior rather than judgmental and abstract behavior. Eagerness on the part of some should not blind educators to the great hazards involved in the more extreme of these suggestions.

Surveys of gifted children show not that gifted children are enthusiastic about mathematics or dislike mathematics but rather that gifted children react vigorously toward mathematics. In 1953, Cutts and Moseley found that mathematics was the subject most often liked best, most often liked least, and most often listed as the one which required the pupil to work hardest. Furthermore, it was frequently described as liked best and hardest and liked least and hardest. It seems probable that gifted children reacted to the challenge or to the defeat which they found in this subject.[12] Evidence from the

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[10] Izaak Wirszup, "Some Remarks on Enrichment," *The Mathematics Teacher*, 49, No. 7, November 1956, pp. 519–527.

[11] Stewart Scott Cairns, "Mathematics, Missiles, and Legislation," *The Mathematics Teacher*, 51, No. 7, November 1958, pp. 514–520, and "Competence Teams Are Delighting," *Education Summary*, 6, No. 26, March 20, 1954, p. 2.

[12] Norma E. Cutts and Nicholas Moseley, "Bright Children and the Curriculum," *Educational Administration and Supervision*, 39, No. 3, March 1953, pp. 168–173.

Terman studies lends itself to similar conclusions.[13] The most vigorous response came from male high school and college students. They very often listed mathematics as the subject liked least or liked best. The females frequently listed it as the one liked least; English replaced it as the one liked best. These evidences indicate that gifted children place mathematics high on the scale of importance among academic subjects. It is obvious that this subject lends itself to standards readily seen and clearly stated. The student perceives his achievement or failure and takes a more energetic position in his feelings toward the content.

Extended experience

Most commonly, schools have enriched mathematics curricula for the gifted by providing additional experience. Very often these additions have been little more than the assignment of extra problems for rapid learners. When problems are a mere extension of drill it is probable that they are damaging rather than helpful but in most cases there has been an attempt to make the extra work thought-provoking and advanced. In some cases, the ablest children take the regular course with the class but are dismissed part time in order to pursue studies not in the regular program.[14] These studies are organized and supervised by either a regular or a special teacher.

Appropriate extra work approximates individual instruction. The intellectually competent group is more variable from case to case than any other group of children and extra experiences appropriate to one child are likely to be unfitted to another. Individualization has been best achieved in organized programs. Some schools including the Polytechnic High School in Los Angeles use job sheets. The student works according to a job sheet and must achieve a satisfactory score on a test before proceeding to the next one.[15] Such adaptations are similar to the Dalton Plan and other individual progress arrangements popular a quarter century ago. Other schools use specially prepared resources units, more advanced texts, or individual and small group projects.

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[13] Lewis M. Terman *et al.*, *The Promise of Youth, Follow-up Studies of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. III, Stanford, California, Stanford University Press, 1937, pp. 63–133.

[14] Joseph J. Latino, "An Algebra Program for the Bright Ninth Grader," *The Mathematics Teacher*, 49, No. 3, March 1956, pp. 179–184.

[15] McWilliams and Brown, *op. cit.*, pp. 13–16.

Some extra assignments deal with the history of mathematics. Many of them deal with the utilization of mathematics. The projects are frequently scientific ones. The student is encouraged to work on radio projects, models which require accurate measurement or graphic presentation. Very often the student's own interest or hobbies lead him to use mathematical knowledge. Stephen is currently interested in model airplanes and in airplane design. Consequently, a very little encouragement causes him to become deeply involved in the mathematics necessary for planning the best wing design or fuselage design for a particular plane.

Correspondence instruction is another means of extending mathematical experience. The University of California at Berkeley offers each of the high school courses through extension study. Local schools which do not offer these courses give credit when the class has been successfully completed.

Other extensions of experience are achieved through mathematics clubs, contests, fairs, and conferences. In the mid 1950's there were approximately seventeen hundred clubs serving about thirty-five thousand secondary students in the United States. The clubs are ordinarily small and meet following the regular school day to provide opportunities for the expression of mathematical interest. Mathematics fairs are much less commonly held than are science fairs. It is probable that mathematics projects are less readily displayed and perhaps are less readily understood by the public. An exception is the all-day mathematics assembly held each year at Purdue University.

Grouping

Extended experience can be provided through the development of extra classes, special classes, and special schools. A student may take extra classes though he is not moved through school in any shorter time. This is a kind of acceleration in which the student is encouraged to take more courses and therefore to accelerate in breadth, rather than vertically. Typically, in the Bronx High School of Science a student might take an enriched mathematics sequence through the complete four years. This sequence includes courses in algebra, geometry, intermediate algebra, trigonometry, and solid geometry as well as advanced courses in higher geometry, algebra, and calculus. Such experiences provide for greater coverage in mathematics and include all mathematics necessary to college entrance. The students are sometimes given advanced work. The advanced work is often calculus.

A slightly different kind of enrichment and acceleration is developed at the George School in Bucks County, Pennsylvania. In this case, superior students may take departmental examinations and receive credit for a course without classroom instruction in that subject. By separating themselves from the class, these students move at their own rate and may take analytical geometry or calculus in order to enter college with advanced standing.

Mathematics is the subject most likely to be offered in the special school or the special class. Commonly, segregation is achieved through a two-track program. In the United States, 62 per cent of secondary schools separate children at the ninth grade with college-bound students registering for algebra and other students registering for general mathematics.[16] A few schools have three- or four-track programs. In these a student may choose to take algebra, general mathematics, or arithmetic. Multiple track programs are less common in the senior high school. Those who take general mathematics are frequently in a terminal course.

There are rare examples of high schools which offer a special track or program as a vocational preparation. One of these is at the Polytechnic High School in Los Angeles where a student may be registered in Industrial Mathematics.[17] Under these plans the special student and the general student spend equal time on mathematics. The more academic classes emphasize abstract and sequential rather than consumer mathematics. The rationale for this segregation is in the nature of the material rather than in the amount.

Acceleration

Special classes and special schools tend to combine acceleration with enrichment. In a number of schools superior pupils complete seventh and eighth grade arithmetic and ninth grade general mathematics in the first two years. In the ninth grade they take algebra and consequently in high schools receive credit for an extra math course.

Some schools accelerate in content without permitting earlier graduation or advanced standing in the next school level. In such cases, the time saved by taking seventh and eighth grade mathematics in one year is spent either in a mathematics course or in some other subject. In a Santa Barbara, California, program rapid learners spend three days each week on materials studied by the regular class. The other two days are spent in a seminar-type program which encourages varied experience and independence.[18] A similar aproach has been tried with ninth graders in Los Angeles.[19] It was found that students with Binet IQs of 125 and up could save about 15 per cent of the regular class time. This saved time was invested in other mathematical activities. It appeared that students had improved attitudes and that the procedure was administratively feasible.

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[16] Arno Jewett, J. Dan Hull *et al.*, *Teaching Rapid and Slow Learners in High School*, Washington, D.C., U.S. Department of Health, Education and Welfare, No. 5, 1954, p. 42.

[17] McWilliams and Brown, *op. cit.*, p. 25.

Children who complete requirements prior to the completion of a required number of units for a diploma pose problems in scheduling when they attend a large high school or college. Adaptations which will avoid articulation problems must provide acceleration in more than one subject. Typically, children admitted to the Special Progress Classes in New York City for the seventh grade must have an IQ of 130, a reading level at the 8.5 grade, a mathematics grade of 8.0, a minimum chronological age of 11, social maturity of 12, parental approval, principal's recommendation, and good physical health.[20]

Instructional methods

A U.S. Office of Education survey of practices in twelve hundred secondary schools reveals a drill emphasis rather than inductive approach for both rapid and slow learners.[21] Though teachers indicate that they encourage students to work at their own rates, the work is often confined to the class topic rather than to all topics which ability will permit. Compared with teachers of slow learners, teachers of rapid learners place less emphasis on drill, scrapbooks, and manual activities which illustrate mathematics. Unfortunately, individual assignments are less commonly made for rapid learners, and gifted students are only a little more commonly expected to evaluate the quantitative reasoning in newspapers or to make up problems which

[18] *Ibid.*, pp. 22–27.

[19] Mary E. Albers and May V. Seagoe, "Enrichment of Superior Students in Algebra Classes," *Journal of Educational Research*, 40, March 1947, pp. 481–495.

[20] McWilliams and Brown, *op. cit.*, p. 23.

[21] Jewett, Hull *et al.*, *op. cit.*, pp. 38–49.

arise from their own reading or to experiment. These latter practices might be much more commonly expected with rapid learners. Very few schools permit the student to use class time on other subjects when assignments are complete. Labs, field trips, and math clubs are also low in the rank order of use.

Suggestions for instruction

Mathematics is frequently taught by memorization or by rote and students compute in ritualistic fashion as though the operations were near magic, untouched by reason or sense. Prior to school entrance, gifted children use leap-and-check or hypothesis-test approaches. They begin with answers and check them out. When Stephen was five he came to his father with a piece of string and said, "An eighth of an eighth of this piece of string is sure small."

The parent gasped and exclaimed, "What?"

Stephen responded, "An eighth of an eighth—that's a sixty-fourth. I don't think I could divide it into hundred and twenty-eighths."

The father recovered his composure and said, "Well, do you think an eighth of an eighth of the world would be so small?"

Stephen replied, "No, that would be pretty big and an eighth of an eighth of the sun would be thousands of times bigger than the world."

Shortly after that, Stephen's father asked him to add 1¾ plus 2¾. Stephen thought for a while and came up with the right answer. His father continued with 1⅚ plus 2⅜. The right answer (even using 24 as a denominator) was given. The father then asked how he had decided that 24 was the lowest common denominator. Stephen did not understand that term and so it had to be explained. After the explanation he said,

> Well, when I have two even numbers like a 6 and an 8 that don't go into each other and there's nothing that goes into both of them, I know I have to divide, what I get when I multiply them, by 2. If it's like 2 and 3 ["odd and even," the parent said] or 3 and 4 and nothing goes into both of them and they don't go into each other then I'll just have to multiply them. If it's two numbers like that—nothing goes into them—I just have to multiply. That's like 3 and 7. But if it's a number, that a number will go into both, like adding 1/6 and 1/9—then 3 goes into both—I know that I have to divide what I get when I multiply them by the number that goes into them. Like

> it wouldn't be 54, but 54 divided by 3 would be the number ["lowest common denominator," inserted the parent]. It would be like that with 10 and 15—5 goes into both—then, of course, you can sometimes make the answer into a smaller number but that's hard to tell at first—like 5/30 would be 1/6.

The parent asked where he had learned all that and Stephen said, "Well, I just figured it out."

The following day Stephen's father asked if he could multiply ¼ times ¼ and the boy asked, "Is that the same as ¼ of ¼?" The parent assured him that it was and Stephen said, "That would be $\frac{1}{16}$."

The father said, "If ¼ by ¼ is $\frac{1}{16}$, then what is ¼ divided by ¼?"

Stephen thought for quite a while and finally he said, "Well, if you get something four times as small when you multiply ¼ by ¼ you must get something four times as big when you divide and so it would be 1 but that sure seems funny."

The leap-and-test approach becomes more appropriate as mathematics becomes more quantitative thought and less ritual and simple calculation. Alfred North Whitehead considered thought to be the goal of mathematics. He recommended that learning mathematics should not be aimless accumulation of special mathematical theorems but rather the development of recognition of relations in space.[22] In his view, the algebraic functions should be taught as the precise expression of physical laws and all mathematics should be taught as quantitative thought.

Effective mathematics instruction results when mathematics courses are not compartmentalized. In a few cases, courses have been designed to interrelate or bring together the materials of algebra, trigonometry, differential calculus and the like. These integrations are effective with gifted students for they reduce the number of details to be learned through increasing the emphasis on relationship or complexity of understanding. The systematic retention of learning depends more on this depth than it does on repetition. Especially for gifted students there should be no sharp separations between arithmetic and algebra, algebra and geometry, or geometry and trigonom-

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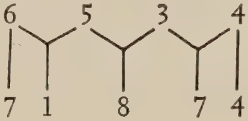
[22] Alfred North Whitehead, *The Aims of Education and Other Essays,* New York, The Macmillan Co., 1929, pp. 124–125.

etry. There is a continuity in thought development. Courses can be arranged in logical order but should not be segmented.

Study of the history of mathematics has been found to assist in integration and focus on mathematical thinking. The historical emphasis is less on dates and names than it is on exposition of currents of thought which caused mathematical issues to be important in their time. Gifted students are intrigued by the formula $E = mc^2$. A discussion of how the twenty-six-year-old Einstein came to formulate this equation or discussion of what this equation means in the scientific development of man encourages the able student to maintain contact with the idea as well as the formula.

The teacher should allow gifted students to use different methods in solving the same problem. The depth and the permanence of learning is determined by its complexity and supporting insights rather than by the number of repetitions or the number of computations which they have performed. Consequently, other treatments of the problem—or attempts to treat a problem in other ways—help to assure retention. The teacher may decide to teach subtraction by the decomposition method because it is most widely used, provides for economical operation, and assures greater visual contact with the process. If the dull child has learned the decomposition method the intrusion of another approach may add confusion and complexity beyond his ability. The gifted child's perception of decomposition and his accuracy in subtraction will be improved when he understands the methods of equal addition, addition-borrowing, addition-carry, or complementary subtraction.

Similarly, multiplication concepts will not be damaged if the student learns to multiply through multiplying the factors in the multiplier and multiplicand or if he learns to multiply by 99 using the formula $100N - N$. Frequently, gifted children discover a method of multiplying by 11. For example, they multiply 6534 by 11 as follows: in the answer or product they first place the last digit of the multiplicand which is 4; then moving left they place the sum of the



last two digits, which is 7; moving left again they place the sum of the second last and third last digits, 8; moving left again they place the sum of the third and fourth last digits being 11. In this case they place only the one, carrying the ten and adding it to the first digit in the multiplicand, making 7. They have the answer 71,874. They soon perceive that they can continue this process through any number and that the operation is simply a matter of adding this number to itself, after moving the second edition of the number over one place. These divergent methods secure rather than interfere with computational skill.

Teachers should encourage unusual checking or computational devices. Various trick checks such as "casting out nines" provide for interest and increase the understanding of the mathematical operation and increase retention.

Gifted children should be encouraged to perform unusual mathemathical operations. Computation using roman numerals helps clarify the decimal or the place system. Use of the diadic (base 2, rather than 10) system helps the child to perceive the difference between fundamental mathematical thought and operational process. Using a binary or base 2 system, the child learns that the units are 1, 2, 4, 8, 16, 32, 64, and so on. To convert to the usual number system he begins with the 1's digit on the right, the 2's next, the 4's next, and on to whatever level is necessary. In this fashion, 78 is written 1,001,110. The child learns that he can find the proper placement either through a counting system or through a subtraction system. He has increased the complexity of his understanding of the system as a system and is better prepared for quantitative thinking than he would be through only manipulation and calculation.

Wherever possible, the teacher should assign challenging and even unusual problems to gifted students. The gifted student who is only slightly acquainted with the concept of ratio may be challenged by a problem which requires that he design a telescope to enlarge one hundred times or three hundred times. The challenging incident may help the intelligent child discover his capabilities.[23] Once the child finds his capacity he is more likely to develop it.

Vocational or consumer mathematics should not dominate the cur-

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[23] Ray Bengtson, "The 'Make 'em Run' Theory," *The Mathematics Teacher*, 51, No. 1, January 1958, pp. 10–11.

riculum for gifted children. Surveys show that social utility dominates some slow learner programs and is even stronger in programs for rapid learners. This vocationalized and technical approach neglects quantitative thought. The vocational approach is most strongly opposed by Beberman and the Illinois group.[24] It is faulty to assume that only "real life"—in a very narrow sense—is interesting. Even cursory thought indicates that gifted students find creative imagination and "unreal" situations provocative and challenging. For them, social applications come easily with maturity and their school experience should explore the theoretical and the imaginative uses of number. They must learn computational skills but the end goal of creative mathematics must be kept in sight.

Language Arts

Language is the ultimate tool of intelligent socialization and its development is fundamental to the development of intelligence. Previous chapters have indicated the significance of language in identification of gifted children and in the development of ability.

Using the Stanford Achievement Tests, Terman found gifted boys to be highest on reading scores with language usage in second place. For girls, the order was reversed, but language and reading held the two highest places.[25] These children scored highest on the English category in the Iowa High School Content Examination. When the teachers of the gifted group were asked to indicate the special abilities and special weaknesses of their students, they most often named special abilities in English. They noted special disabilities more commonly in mathematics, language, and science. The students themselves list English high among the subjects liked—first for girls and third for boys. When the students were in college, English had retained first place among women and had moved to first place for men. More of the women majored in English than in any other subject and among men, English tied for first place with chemistry.

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[24] University of Illinois Committee on School Mathematics, *High School Mathematics, First Course,* Urbana, University of Illinois, Unit 1, 1955.

[25] Terman *et al., op. cit.,* pp. 78–114.

Practices

Gifted children are likely to be more distinctively different in general information and in language than in other readily observed characteristics. By the middle of the first grade a sizable number of gifted children read and comprehend books designed for the fourth grade and up. Their performance is not simply technical skill for it involves comprehension of high order. It may be the obviousness of these superiorities which has caused teachers to make more adequate adaptations in English than in some other school subjects. On the other hand, the adaptations may arise from the greater adaptability of the material itself. It is perhaps true that English literature and composition are inherently open to creative opportunity. Literature allows for simultaneous interpretations at various levels of complexity and, therefore, for individuation. Likewise, English composition may be assigned so individually that a child with third grade ability and a child with tenth grade ability may be taught in a single group. Whatever the cause, it appears that school adaptations have been comparatively more adequate in language arts with the exception of grammar and spelling than in most subject matters.

Special programs for gifted children have ordinarily attempted to provide extensive opportunity to talk, read, and write. One of the early programs reports that special efforts were directed toward writing poetry, analyzing good descriptive passages, and writing descriptive materials.[26] The 1953 survey of secondary schools conducted by the U.S. Office shows a continued enthusiasm for the extension of experience, particularly in the field of literature.[27] Teachers of rapid learners encourage extensive reading of good literature more frequently than any other enrichment device. Teachers of slow learners use it seventh among thirty devices.

The survey of twelve hundred schools indicates that many procedures are chosen from necessity. The use of simplified and abridged editions was common with slow learners but is in last position for the rapid learner. Clearly, such choices are all but forced on the teacher. Another example of practice arising out of necessity has to do with the encouragement of participation in speech and writing contests. This item is about midway in the scale of use for rapid learners and near the bottom for slow learners. Obviously, this is an enforced rather than a free choice.

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[26] Lulu M. Stedman, *Education of Gifted Children*, Chicago, World Book Co., 1924, pp. 149–170.

[27] Jewett, Hull *et al.*, *op. cit.*, pp. 21–32.

The choices made on the basis of possibility often result in desirable procedures. The survey shows that teachers encourage extensive reading for the gifted but especially in the classics and fairly sophisticated works. For slow learners the emphasis is on finding substitutes for comics and inferior magazines. With the gifted they study usage and grammatical rules which are inconclusive, debatable, or variable but with slow learners they concentrate on minimum essentials and fixed rules. Proportionately they use recordings, audio-aids, and trips more with slow than with rapid learners.

The survey also reports some emphases which seem unsound. There appears to be more concern with selecting materials appropriate to the slow learner than selecting materials adequate for the gifted. This probably results from the continuing effort to assure that each student meets minimum standards. It appears, also, that gifted students are not adequately involved in evaluation, selection, and organization of their own study materials. Teachers of slow learners and teachers of rapid learners indicate almost identical emphasis on unit-organized teaching, student-chosen activities, and self-evaluation. This seems unwise since gifted children are best taught in unit methods and are more capable of evaluating their own progress or designing their own plan of study.

Major characteristics of language arts instruction for gifted students

There are five major characteristics of language arts instruction for the gifted.

First, reading instruction is aimed at qualitative change in reading rather than the development of technical skill. Gifted children are usually excited about reading and use a large measure of self-instruction. Nevertheless they, too, have problems. Primers or preprimers may be inadequately challenging.[28] They may memorize rather than read or verbalize without achieving a suitable reading rate. Most but not all recognize the main idea and the sequence of thoughts but some read in disjointed pieces substituting accuracy of detail for sense. These excel in word-saying but need assistance in critical reading. All teachers seek to teach more than literal reading but teachers of gifted children are particularly concerned with what might be called critical and functional reading.

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[28] Walter B. Barbe, "Problems in Reading Encountered by Gifted Children," *Elementary English*, 33, No. 5, May 1956, pp. 274–278.

A second characteristic of procedures for gifted students is a tendency to allow students self-discovery in some unified and whole experience. The student is encouraged to direct and evaluate his own performance. He is encouraged to write or speak out of interest. Because he is interested it is assumed that he will seek to learn the essential techniques. There is a recognition of the importance of neatness, legibility, spelling, sentence and paragraph structure, punctuation, grammar, and coherence, but it is hoped that these will arise from the material and from the purposes of the students. In the Cleveland Major Work Program the free flow of ideas is drawn out so that something worth polishing may be produced.[29] Little writing is done for the sake of practice or to teach the rules and techniques of grammar.

Personalized values are most readily observed in creative and imaginative writing. Such forms of self-expression provide an antidote to mechanization and crowd demands. At least creative writing provides opportunities to develop values and organize ideas.[30]

These objectives are achieved in work organized around centers of interest which integrate several language activities contributing to the immediate need. Under such conditions, instruction is complex and non-memoriter. Formal and traditional programs assure that instruction will be given but the more incidental approach may become an accidental approach unless language development is a clearly perceived goal. There is a danger of haphazard instruction and haphazard standards, but when the methods are well implemented, the achievements are superior.

The center-of-interest approach leads to a third characteristic—the functional development of language. In the Cleveland program, most writing was directed toward social ends—in letter writing, poetry, or a class play. In the Hunter Elementary School the children are also encouraged to express real concerns or interests.[31] Little distinction is made between oral and written communication. The curriculum includes dramatization, choral speaking, gathering of information, writing the minutes of meetings, speaking, or other communication experiences. As a need for technique arises there is extensive individuation with programs set up for self-help in which the child uses dictionaries, pretests, workbooks, and other devices.

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[29] Theodore Hall, *Gifted Children, The Cleveland Story*, Chicago, World Publishing Co., 1956, pp. 50–55.

[30] Paul Witty, "Some Values of Creative Writing," *Elementary English*, 34, No. 3, March 1957, pp. 139–145.

In the unit and functional approach there is a general acceptance that participation is necessary for growth and that the activity must be broad enough to include participation suited to children over a wide range of intellectual development. The teacher helps the child discover needs, formulate study plans, and improve vocabulary. Since children in a single classroom will vary as much as six or eight years in mental age and five or six years in educational age, the broad, expressive objectives are not likely to be achieved in highly compartmentalized and formal programs.

Those who have used functional approaches ordinarily conclude that these methods do not produce careless, unthinking activity.[32] The goals are reached imperceptibly and slowly and are rarely arrived at through outright direction on the part of a teacher. Despite hazards, the functional and unit approach to learning communication appears effective.

The fourth characteristic of procedures used with gifted students is enrichment and extension of the literature program. There is a commonly accepted argument that more intelligent children are able to deal with and to profit from the classics. The allusions, metaphors, and ideas of literature may have little meaning for slow learners but are full of experience for the gifted. Teachers have made an extended effort to arouse their sensitivity, stir their imagination, and form their ideals through reading.

A fifth characteristic of programs in language arts is an emphasis on creative writing and creative expression. Gifted people have a fascination with words and very early in life they begin to express themselves in dialogues with imaginary companions and in story-telling. In early speech, the child imitates adult thought and imagery. Sometimes, fundamental ability is drowned or destroyed by speech limitations which surround the child. With other children development is hampered by parents and teachers who disparage or discourage creative and imaginative expression. Teachers who advocate extensive experience in creative writing are usually the same teachers who argue for extensive experience in good literature. They assume that one supports the other and that together these experiences provide a base for independent and creative thought.

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[31] Gertrude Howell Hildreth *et al.*, *Educating Gifted Children at Hunter Elementary School*, New York, Harper & Brothers, 1952, pp. 119–125.

[32] Hughes Mearns, *Creative Youth*, New York, Doubleday, Page and Co., 1926, pp. 65–67.

Many special courses and special programs demonstrate several of these characteristics. A program in Stamford, Connecticut, is labeled "Creative Writing" but provides for special learnings, critical thought, unit organization, qualitative changes in reading, creative writing, and the extension of literary experience.[33] The children who participate in the program have earned a B or better in English and are genuinely interested in writing. They participate in a unit arranged in two major divisions. The first division includes reading and critical study of some of the best writing in the particular field of interest. The second part is original, creative writing. This writing may take any form: story, play, poetry, or radio script. The class has group and verbal communication experience in editing and organizing the material. It is then printed on a school press and since this press is comparatively small, each page is printed, the type broken up and the next section printed. Consequently, there is a continuous experience as a co-operative group between the English department, the printing department and the art department.

Obviously, all five characteristics common in programs for the gifted are involved in this over-all enterprise and the creative writing class at Stamford is fairly typical of programs for the gifted, who are encouraged to do more choosing, planning, and evaluating. They are encouraged to read more independently, write more originally, and involve themselves in ethical and social considerations.

The development of creative language is promoted by an accepting attitude on the part of the teacher. A sarcastic or critical teacher would have squelched the sparkle, the ego-involvement, and the freedom which Stephen brought to the following story.

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[33] Robert W. Stoughton, *Current Practices in Connecticut Secondary Schools, Provisions for the Gifted*, Hartford, Connecticut, State Department of Education, Bureau of Youth Services, 1954, pp. 11–12.

> I remember one o' the times I was a guidin' a party of tenderfeet huntin' fer big game out in the North Woods. 'Bout the first night out they ast me fer some o' my background. So's I telled about the time I was younger, and went out for more advanced sorta sport . . .
>
> Anyhow, I was out huntin' hide-behinds, so-called cause o' the strange habit o' hidin' behind trees and thet sorta thing. Well, I bagged a couple hide-behinds, and thought that I'd like to get a whirling-gumberoo. These animals what ain't animals look kinda like zebras, 'ceptin' they got chartruse bodies and plaid stripes. They has also got enormous tentecles on their backs, fer catchin' yu. Anyway, I'd gone into a canyon with high walls on every side, an' had gone around a bend so's I couldn't see the way thet I had come. Now, these here whirlin'-gumberoos like to follow folks, and sure nuff, one was followin' me thet very instant. I knew thet if he se'ed me, he'd grab me with those ol'tentecles 'fore I could say "phormasonaphonic phystarises." Anyhow, I knew he was around thet thare bend. 'Bout that time I chanct to look into my ammunition bag, and I hadn't but one solitary bullet left. The only way I could kill the thing afore it kilt me was to ricochet my bullet off the wall, around the bend, an' into thet whirlin'-gumberoo. So I gauged my angle of deflection, calculated the rock density, wind strength, the rifeling of the barrell, the number of grains of powder in the shell, took aim, and fired.
>
> Bout this time one of the owl-eyed greenhorns says "w-what happened?"
>
> Nothin', I answered, "I missed the wall."

Some general recommendations

1. Provide challenge.
   - —Allow bright pupils to use advanced books.
   - —Do not insist on primers for all beginners.
   - —Allow reading to each other.
   - —Encourage functional writing—news reporting, science journals.
   - —Make writing and communication easy and pleasant, no over-rigid technical requirements.

- —Use unabridged fine literature.
- —Write about characters more than events.
- —Relate writing and drama to social studies.

2. Encourage enthusiasm.
    - —Be liberal in teacher-interest.
    - —Establish some "well-loved" poems and "well-read" stories.
    - —Visit with a writer.
    - —Have older children "come down" and read their poems or act their plays.
3. Extend experience.
    - —Invite children to write or read for others.
    - —Encourage other forms of writing—plays, blank verse, surprise endings, onomatopoeia.
    - —Help individual find excitement in his own history or experience.
4. Develop language for learning tasks.
    - —Teach speedy, accurate note-taking.
    - —Teach outlining skills.
    - —Teach use of footnotes, abbreviations, etc.
    - —Develop scientific and cultural vocabulary.
5. Provide a learning laboratory.
    - —Encourage story telling from childrens' experiences.
    - —Teacher should read some of childrens' work to class.
    - —Allow spontaneous story or dramatic contributions.
    - —Have students make sentences from given words.
    - —Have class rearrange "poor" sample sentence.
6. Provide laboratory opportunity to correct minor and technical reading problems.
7. Demonstrate variability of rules.
    - —Allow departure from correctness when this increases effectiveness.
8. Encourage imaginative expression.
    - —Write scripts.
    - —Tell the "tall tale."
    - —See part of a picture, tell the story.
    - —Do "free associating."
    - —List words to describe the "feel" of a hidden object, a piece of music, or a stimulus sound.

9. Teach students to think. Language skills cannot be learned without expressing ideas and relationships. Use the "stuff" of social studies, drama, and science for the substance of language arts instruction.

13

Social Studies and Science

The advent of universal representation or democratic government brought a clear demand for universal education. At first the goals were largely civic and religious. Some of these, such as understanding of the governmental process, were common to most countries. Others, such as the American purpose of unifying a variety of peoples, were more localized and specific. The purposes were gradually expanded to include vocational, recreational, and health goals. New courses entered the curriculum and old courses shifted position in the educational hierarchy. Modern schools continue the socio-political goals of patriotic dedication but curricula are modified to include new problems which arise from rapidly growing populations, from proportionately depleted resources, and from greatly increased government influence in the lives of individuals. Development in scientific thought and technology made science an essential subject of study. Like social studies, the content of science courses changes quickly. Both areas include large amounts of new knowledge, learned nearly simultaneously by student and teacher.

Social Studies

Educated man must be acquainted with ideas of the past and with history which sheds light on the present. He must know the geographic and economic conditions of other nations and he must know the conditions of his own people. Particularly, he must be well grounded in the values, agreements, and operating procedures of his own society. His schooling includes history, geography, civics, and practice in the social and governmental techniques of his community.

In an earlier period, the educated man (regardless of profession) was expected to be a contributor to freedom, a leader in social thought, and a social force in the community. With abandonment of feudalism the broad general competence of the educated man was less commonly assumed. The period of industrial expansion enlarged popular esteem for mechanical and materialistic accomplishment and encouraged the practical, the standardized, and the centralized aspects of culture. Specialism grew with a common view between experts in the same field and little communication between experts in various fields. In order to restore wholeness to education, schools made special efforts to assure breadth of education and integration of the various knowledges. History, geography, civics, and associated subjects were related under the title *social studies*. It is impossible to evaluate these programs without being aware of the governing purpose which brought the several subjects together.

Social studies and social living courses have provoked some of the bitterest criticism leveled at modern education. Critics argue that discussion procedures have been overused and maintain that the courses are offered with a shortage of facts and a lack of rigorous standards. They contend that gifted children should study in segregated classes and that they should take separate courses in history and geography.

The value of segregation in the social studies is vigorously disputed. Some teachers argue that segregation in order to teach facts interferes with the accomplishment of other objectives. They are convinced that the mastery of facts is not the only or even the central task of social studies. They contend that these courses provide apprenticeship as a citizen and the major achievements should be personal integrity, human sympathy, social responsibility, realistic self-evaluation, and the skills of democratic co-operation.[1] Such teachers are unwilling to accept a two-track program with factual and academic education for the gifted, and social or adjustment education for the average and the dull.

There is no universality of agreement but educators seem to prefer differentiation of assignments rather than a clear-cut separation of curriculum in the social studies. Some hold that the curriculum is a matter of necessity and not of taste, that it arises out of the sociological and cultural needs of the society and may not be determined purely on the basis of the psychological differences of the student.[2] They argue that knowledge, skills, insights, attitudes, and habits which are crucial to socialized living must be learned by all students regardless of ability and since all of these will live and work together they must participate together in the schools.

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[1] Virginia C. Brown, "The Problem of Grouping in the Social Studies: A Junior High School Teacher's Viewpoint," *California Journal of Secondary Education*, 30, No. 1, January 1955, pp. 42–45.

Instructional practice

Instructional practice in the social studies illustrates many characteristics which have been advocated for education of able persons. Social studies are core or unit organized, allow for individual projects, encourage self-direction, allow wide-range reading activities, depend on investigation and invention, and develop judgment and self-evaluation.

From the U.S. Office of Education report on the survey of secondary schools it appears that three provisions are commonly made for rapid learners: (*a*) Increased attention to current events and current problems, (*b*) individual investigations using standard references, and (*c*) encouragement of critical thought and socialized recitations.[3] These same practices are extensively used with slow learners. Large units of study, socialized recitation, current events, pupil-teacher planning, charts and graphs, and individual study are as commonly used with slow learners as with rapid learners. The latter group are more often assigned research projects, more often encouraged to use critical thinking in seeking a class solution to a social problem, and more often encouraged to read classics of historical significance. The differences in practice seem comparatively few.

Suitable practices

Five characteristics of social studies education for the gifted warrant mention.

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[2] Ernest Horn, *Methods of Instruction in the Social Studies*, New York, Charles Scribner's Sons, 1937, pp. 66–68.

[3] Arno Jewett, J. Dan Hull, *et al.*, *Teaching Rapid and Slow Learners in High School*, Washington, D.C., U.S. Department of Health, Education and Welfare, No. 5, 1954, pp. 32–42.

First, the more successful programs are unit organized. Typically, Hollingworth had students develop such units as "The Evolution of Common Things" and "The Growth of Law and Order." [4] The project knits the individual objective to the group objective allowing the gifted student to search for facts, organize ideas, and participate in discussions.

Second, teachers encourage personal involvement and an increased level of participation in the social studies experience. The school is arranged as a laboratory; the children participate in the government of their own classroom, they study welfare agencies, discuss problems in their community, summarize units of study, and evaluate their own work. There are exchanges within or between communities so that students will have broader understandings. Students are encouraged to take a very active and responsible part in both academic and community activities.

A third mark of social studies for gifted children is a large element of self-direction. It has sometimes been maintained that one of the major teaching responsibilities is to "stand aside." Something can be said for the point of view that the teacher should provoke rather than direct the learning of gifted children but it seems erroneous to follow the sometimes advocated strategy of "giving the child his head." [5] The hazards of such a course evidently include the dangers of piecemeal, irregular, and immature motivation leading to disjointed and inadequate learning. There is, further, the hazard of premature exposure to adult problems and adult ideas. The teacher is responsible and must protect the child from unhealthy experiences and arrange activities appropriate to the present stage of development. Good teaching is not undirected, though the best direction is frequently given through a stimulating question more than by teacher-imposed regulation or dictation.

Fourth, social studies education for the gifted provides suitable opportunities for the development of leadership. Social responsibility and creativeness is encouraged through teacher praise, teacher discussion of proper goals, and opportunity for practice. Schools attempt to develop sensitivity to individuals, concern for group values, respect for majorities, ability to make formal presentation, skill in discussion, parliamentary procedure, and knowledge of organizational principles.[6] Social and gregarious outcomes need not dominate the social studies. Our society rewards the gregarious extrovert but some teachers maintain that outgoingness is overpromoted and withdrawing behavior is too greatly feared.[7] Not every child should be driven by a strong desire to be captain or by needs to express convictions on every occasion. Many children will find considerable happiness in academic or scientific pursuits and it seems unwise to demand that each child shall participate in every activity. On the other hand, the optimum function of democracy must result from the participation of the ablest citizen and the school is charged with the responsibility of providing opportunity for each student to learn the skills which will make his democratic participation possible.

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[4] Leta S. Hollingworth, *Children Above 180 I.Q.*, Yonkers-on-Hudson, World Book Co., 1942, pp. 292–294.

[5] Harold W. Stoke, "Some Observations on the Education of Gifted Children," *Educational Records*, 38, No. 2, April 1957, pp. 133–135, and "What to do for and with the Gifted Child," *Professional Growth Guide for Teachers*, Section 11, New York, Arthur C. Croft Publications, 1957.

Fifthly, programs for the gifted emphasize the complexity, tentativeness, and debatable nature of most solutions and conclusions. Social studies teachers help gifted students to recognize the difficulty in finding conclusive answers in material or studies where accurate measures are impossible, where laboratory experiments are unlikely, and where controls are extremely limited. Students are encouraged to examine what they have learned so that they may understand how facts are changed by dogmatic partisanship. They find that the complex materials of the social sciences so impinge on all of us that these fields are particularly given to vigorous and unsupported opinions. They learn that the less demonstrable the conclusion is, the more dogmatic the assertion may be. The cynicism and pessimism which might arise from such considerations is forestalled by the positive satisfactions of participation in the social milieu of the school and by the balanced evaluations of the teacher.

Modern social studies instruction for gifted children may sometimes be fragmentary and overly contemporaneous. Unless these shortcomings are offset by good teaching they result in superficiality and hasty judgment.

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[6] Robert F. DeHaan and Jack Kough, "Helping Children with Special Needs," *Teacher's Guidance Handbook,* Vol. II, Chicago, Science Research Associates, Inc., 1956, pp. 50–59.

[7] Walter B. Barbe, "Must Everyone be Trained for Leadership," *Educational Forum,* 18, No. 1, Part I, November 1953, pp. 49–53.

The integration of subject matters, the development of reasoning, and the self-direction which characterizes children of superior intellectual ability is illustrated by a conversation with Stephen. As part of a school project in the social studies he had chosen to compare a contemporary great man with a great man of a hundred years ago. In a friendly conversation with Dr. Henry, a college professor, he was discussing his selection and had almost concluded that he would choose to compare Linus Pauling with Charles Darwin. As he planned the comparison he noted that mathematics certainly played a large part in science a hundred years ago and in science today. He suggested that it would be impossible to determine if the fittest survive without "some measure of survival against the norm." Then he asked, "Do you know if Darwin used a normal curve? How did he estimate what kind of animals were missing from all that would have lived if there had been no natural selection?"

The ensuing discussion turned to general problems of mathematical prediction and to the British interest in statistics. Professor Henry indicated that accurate comparison of the relative position of one person in his group with the relative position of another person in his group was impossible just more than a century ago. In this discussion it was clear that Stephen understood the normal curve and that he knew that Galton's conclusions used the normal curve concept. The professor remarked that almost all work in scientific genetics demands the use of statistics and mathematics. Stephen responded with, "Well—yeah—Y' gotta kind of figure out how much like the parent the child is."

Dr. Henry encouraged Stephen to explore this idea by asking whether prediction simply involved measuring likeness or whether it involved measuring difference as well. Stephen's answer was, "I don't really know if you can say that similarity and difference are different. They are really just different ways of saying it. If I say it's dark or it's not light, that's the same."

Dr. Henry promoted the issue with, "Is there no mathematical difference at all?"

Stephen replied, "Well, yes, if I say it's almost dark, then I'm measuring a distance from real dark. If I say it's not light, I'm probably measuring from very light or bright—that's only stating it from different ends of the curve. That's the way I think it would be in genetics. You could say the young ones are like—or unlike—the parent, but really it's all in the same curve. Both ways are a measure of how far away it is from the parent."

The professor concurred that similarity and dissimilarity were much alike and that many measures were made in units or degrees which simply suggested a portion of the greatest possible separation. He then raised the question of whether or not a specific curve might explain most genetic variations or similarities.

Stephen at first responded positively but then he was not sure that the heights of Mendelian peas could be plotted on a smooth curve. He knew that some were tall and some were short, that some of the tall were taller, and some of the short were shorter. He was not certain that the Austrian monk had produced peas of such various heights that they formed a completely normal pattern from very tall to very short.

Stephen then discovered, or rediscovered, a mathematical or quantitative relationship to genetic theory. He discussed the stronger and weaker potentials which seemed to exist in certain genes. In elaborating his point he discussed the usual examples of inheritance in eye color. He was then asked if he knew what happened when genes were equally potent or equally powerful. He replied, "I think I've read about that. As near as I remember the animal seems to be half and half. I guess if an animal with a very long neck was bred to an animal with a very short neck, the baby would be middle length."

The professor wondered how this would apply if race horses with long legs were bred to work horses with comparatively short legs. The question led to a change in direction with Stephen discussing purposeful selection to obtain the best stock. Stephen began to discuss Darwin's effect on man's behavior. He asked whether Darwin's ideas had caused Hitler to accept a theory of race supremacy or whether Hitler had come to the racist conclusion in some other fashion. Dr. Henry pointed out that beliefs about racial superiority and inferiority were very old. Stephen turned the discussion to the Negro. He pointed out that Darwin's ideas were not popularized until after the turn of the century and that Negroes had been considered inferior for centuries. He said, "The Germantown Petition shows that some people thought that the Negroes were inferior. If they didn't, the petition would not have been necessary and would not have been signed."

Professor Henry asked what the date of the Germantown Petition was and Stephen guessed that it was perhaps seventy years before the Civil War. He did not think this the beginning of hostility because he was sure that "slaves never enjoyed being slaves." The professor asked how long this had been a problem in the United States and Stephen said that the Spaniards brought slaves to America just a few years after Columbus.

This conversation is not atypical. Gifted children have a spectacular ability to interrelate and to draw together with little regard for subject-matter boundaries. They are interested in the consequences of scientific or historical facts and their conversation is filled with "why," "how," and "what happened." Conversation provides an opportunity to make errors and to correct these errors as logic reveals that a mistake has been made.

Successful teaching uses the natural proclivities of the child. The good learning situation is not unlike the conversational atmosphere. Social studies suitable for gifted children provide for discussion, self-direction, initiative in thought, development of responsible judgment, critical accuracy, and development of a value system which leads to active social responsibility.

Some suggestions in the social studies

1. Encourage "thinking aloud." A primary goal is to teach judgment or thinking. Organized discussion helps the student to understand the assumptions he has made, the evidence he has neglected, and the conclusions he has reached.
2. Provide an accepting and friendly atmosphere. This does not imply intellectual softness. Self-respect and willingness to participate are more likely to be achieved in a classroom where careful workmanship and facts are valued. Good teaching allows the student to make an error but also makes him aware that it is an error. A desirable atmosphere provides security which causes the recognition of an error to lead not to withdrawal but to correction or more adequate response.
3. Relate the thinking which goes on in the social studies to development in the language arts. These functions of growth are inherently integrated. The development of thought is dependent on the development of communication. On the other hand

it is impossible to develop high-level language skills without a base of thought and judgment.

4. Require students to learn ways of presenting data.
5. Provide opportunities for organizing data and require high standards of achievement.
6. Teach the mathematics of comparison. This is a fundamental skill of scientific social studies.
7. Make special research assignments. These should not be vague, unplanned, or unevaluated though their planning and their direction should involve the student. The greater expenditure of teacher-time in student planning is economical. Once the gifted student sees the goal and the frame of reference, he will be less dependent on the teacher and more dependent on logic and judgment.
8. Teach parliamentary procedure. This is vital to citizenship and effective in scientific and vocational endeavor.
9. Do not encourage projects so far beyond the student's understanding that the solutions are meaningless. A gifted child in the third grade might more profitably study problems of sanitation in his own community than problems of government in Korea.
10. Leave the way open for leadership with the teacher taking the role of a resource person.
11. The teacher's major leadership function is to help students see a goal. Be cautious not to overadvise or lead overactively.
12. Do not always assume leadership when the going gets rough because this interferes with the development of responsibility.
13. Encourage discussions which bring in related or tangential problems, always causing the class to estimate their appropriateness and continue or discontinue them after evaluation.
14. Use crucial events in order to explain the development of an idea.
15. Help students visualize scenes from history. Encourage reports which are descriptive. Make assignments which require an imaginary interview with an historical figure or write the dialogue which would ensue if an historical figure visited a radio program such as "Youth Views the News."

16. Encourage collections or other independent enterprises in the social studies.
17. Make clear to students that the democratic thesis implies that logic and reasoning lead to moral and responsible judgments. As children mature, encourage them to examine their own responsibilities and appraise their own behaviors. Encourage the development of actions which are appropriate to their knowledge and their understanding.
18. Good judgment requires facts. Knowledge and ability to discover facts are essential goals in the social studies.
19. Provide opportunity to learn responsible participation with groups. Provide opportunity for student-planned activities, for student government and for student service to others. Gifted children can help others in academic and social ways. For some of this responsible participation, it may be necessary to go into the community or further afield but the best opportunities are within the classroom and certainly within the school.
20. Emphasize history as background for interpreting literature, economics, or social facts.
21. Insist on facts but also teach the meaning or organization of these facts—the great sweeps of history, the broad influences of economic theory or the relation between industrialization and political change.

Science

Intelligent children usually enjoy science. Here is a field for their insatiable curiosity. They are challenged by the experimental method and excited by laboratory equipment. Scientific study offers a future with material and social success; more scholarships and more remunerative scholarships than in other fields. A very large number of intellectually able students express interest in science and the scientific professions. In the last quarter century science may have replaced English as the favorite subject among gifted high school students.

The National Association of Secondary Principals sponsored a study of seven thousand seniors who took the National Scholarship Examination in 1952. The results indicate that science was the best-liked subject by both boys and girls.[8] Other studies of the National Honor Society Program in 1953 and 1956 reveal that students of high ability elected more than the required number of courses in science and mathematics and many hoped to enter scientific vocations. Mathematics and science courses combined, amounting to more than six and one-half years of work, constituted 40.6 per cent of the total graduation requirements for the 1953 sample.[9] These courses are in slightly larger proportion for the 1956 sample and make up 41.1 per cent of the total program. Among the 1953 winners, 55 per cent of the students indicate plans to work in science, engineering, or one of the technical fields in which mathematics and science are prerequisites. The 1956 percentage had risen to 60. Undoubtedly, part of this interest arose because there was a shortage of scientific manpower with many opportunities for those who were adequately trained.

The alleviation of the manpower problem is only one function of science education in the elementary and secondary school. It is consistently evident that science plays a major part in modern living regardless of the vocation to be pursued. Science is part of literacy, essential to understanding or applying generalizations in everyday life. The relation of man-to-man and the relation of man to his environment have been profoundly altered through scientific applications. Science is essential to both general and vocational education.[10] Various professional bodies have recognized the need to assure a broad, liberal background so that professional scientific training can be truly functional. These professions hope to assure that the student will develop reasoning power, that he will know the "why" as well as the "how" and that he will bring to the practice of his professional science the critical and judgmental earmarks of a liberal education.

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[8] Will French and Alfred H. Skogsberg, "Educating the Talented Students in High School," *Bulletin National Association of Secondary School Principals,* 38, No. 202, April 1954, pp. 368–380.

[9] M. H. Ahrenbt, "Mathematics and Science," *NEA Journal,* 46, No. 2, February 1957, pp. 109–110.

[10] See Darrell J. Barnard, "Science Today," *NEA Journal,* 46, No. 1, January 1957, pp. 22–24, and Dael Wolfle, "A Long-Term View of Liberal Education in the Light of Manpower Needs," *Selection and Guidance of Gifted Students for National Survival* (Arthur E. Traxler, Ed.), A Report of the 20th Educational Conference, held in New York City, October 27–28, 1955, under the auspices of the Educational Records Bureau and the American Council on Education, Washington, D.C., American Council on Education, 1956, pp. 11–22.

Accuracy, a questioning spirit, and an inventive imagination are valuable in both professional and personal life.

Special motivations in science

The most remarkable attempts to motivate academic study have occurred in science. James R. Killian, president of the Massachusetts Institute of Technology and formerly special assistant to the President on science and technology, has suggested the establishment of several thousand new scholarships on a four-year basis. He proposes that there should be at least nine thousand competitive, annually awarded scholarships in order to encourage more of the top third of high school graduates to continue in college.[11]

These proposals are motivated by the challenges of a scientific age and by the demand for scientific know-how in business and in industry. They are also motivated by the knowledge that only one-third of the ablest third of high school graduates secure a college degree. In 1955, nearly two hundred thousand high school graduates of college caliber did not enter college.[12] Among those who wished to go to college, six times as many preferred to become physical scientists as wished to be social scientists. Therefore, it would seem that scholarship programs should greatly increase the number of available scientists.

Several large-scale efforts have been directed toward the support of research and education in the natural sciences. The National Science Foundation awarded almost two million dollars during the quarter year ending June 30, 1955. During the preceding four years the Foundation made 1,650 awards totaling more than seventeen million dollars.[13] In 1956 the same foundation awarded more than nine hundred predoctoral and postdoctoral fellowships and more than four million dollars in grants to sixteen colleges for the purpose of improving science and mathematics teaching.[14]

[11] James R. Killian, "Bold Strategy to Beat Shortage," *Life*, 40, No. 19, May 7, 1956, pp. 147–150.

[12] Charles C. Cole, Jr., "Current Loss of Talent From High School to College," *Higher Education*, 12, No. 3, November 1955, pp. 35–38.

[13] U.S. Department of Health, Education and Welfare, "National Science Foundation Grants," *Higher Education*, 12, No. 3, November 1955, p. 34.

[14] U.S. Department of Health, Education and Welfare, "National Science Foundation Grants Help Scientists and Mathematicians," *College and University Bulletin*, 9, No. 4, and 5, November 15 and December 1, 1956.

The best-known effort to motivate scientific education was begun in 1942. Science Service developed the National Science Talent Search for Westinghouse Science Scholarships in order to discover and foster scientific skill, talent, or ability and to focus attention on the vital role of science in the modern world.[15] In 1958, more than twenty-five thousand contestants participated in this program.[16] Undoubtedly, these numbers were swelled by momentary enthusiasm. However, large numbers were interested previously and about three thousand completed the requirements for entry each year. These requirements included a science aptitude test, a personal data sheet, a scholarship record, and an essay of about one thousand words on "My Scientific Project." All but the top three hundred were eliminated and from this number, forty were selected to attend the Science Talent Institute in Washington, D.C. The remaining 260 received honorable mention. The final selections were from the top forty.[17] The records show that all entrants, but especially winners, have enviable college records with approximately four out of five majoring in scientific fields.

The records raise an interesting question concerning the nature and nurture of scientific ability. In the first year, three and a half times as many boys participated as girls. Twenty-two of the boys made less than five errors but no girl earned such a good score. Of the forty winners, twenty-eight were boys and twelve were girls, yet if top honors had been given regardless of sex there would have been even fewer girls.[18] This masculine dominance has been consistent and it raises an intriguing question concerning nature and its relation to scientific ability.

It was also discovered that test scores were fairly independent of the amount of specific training the selectees had in mathematics or science.[19] At the same time, states with high economic indexes contributed a disproportionately large number of winners. These data support Terman's findings which show that specific subjects studied or time spent in the study of a specific subject are less important determiners of academic capacity than are intelligence and environment.

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[15] Watson Davis, "Search for Talent in Science," *The Gifted Child* (Paul A. Witty, Ed.), Boston, D. C. Heath and Co., 1951, pp. 235–242.

[16] "Education," *Time*, 71, No. 11, March 17, 1958, pp. 41–42.

[17] Harold A. Edgerton and Steuart H. Britt, "The Third Annual Science Talent Search," *Science*, 99, No. 2573, April 21, 1944, pp. 319–320.

[18] Harold A. Edgerton and Steuart H. Britt, "Sex Differences in the Science Talent Test," *Science*, 100, No. 2592, September 1, 1944, pp. 192–193.

[19] Harold A. Edgerton and Steuart H. Britt, "Technical Aspects of the Fourth Annual Science Talent Search," *Educational and Psychological Measurement*, 7, No. 1, Spring 1947, pp. 3–21.

Terman found that any person who later showed real promise in a special field had qualified on the basis of general intelligence rather than on the basis of special talent.[20] These data combined with the evidence on the limitations of specialized training support the contention that scholarship selection should place considerable weight on general intelligence rather than on specific skills or on specialized childish accomplishments.

Organized interest in science has promoted science clubs in many small schools. These groups invite guest speakers, make field trips, or prepare demonstrations for parents' night. Their inception is dependent on an enthusiastic teacher, but shortly they affiliate with Science Clubs of America and eventually most of them participate in Science Talent Search.

School practices

To meet the demand for highly trained scientific personnel and at the same time to provide all students with cultural scientific background, most secondary schools are moving toward a two-track pattern of science courses. One track, designed for those with a general and cultural interest, may include only biology or may include biology and a general science course. The second track or special interest pattern includes chemistry and physics and is designed for college preparation. Because specialization in science is more widely accepted than specialized programs in other subjects there are more honors classes and special classes.

A survey of practices shows that a special program is arranged for about sixty-five students at North Phoenix High School in Phoenix, Arizona.[21] Very competent students are selected on the basis of past records, standardized tests, teacher-counselor recommendations and an interview with the instructor. Those who register for the special physics class must have had three years of mathematics, be taking a fourth year and must demonstrate ability to do superior work. The methods in this class are academic. Lectures, demonstrations, and explanations feature theoretical detail and highly mathematical concepts. The class covers approximately three times the usual number of problems and these are from advanced materials or college texts. Each student sets up a research problem and must report it to the class with good standards of English and scientific accuracy. The students listen to addresses by scientists in the community, read current scientific literature, and participate in the Westinghouse Science Talent Search.

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[20] Lewis M. Terman *et al.*, *The Promise of Youth, Follow-Up Studies of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. III, Stanford, California, Stanford University Press, 1937, pp. 481–482.

[21] Robert J. Havighurst, Eugene Stivers, and Robert F. DeHaan, *A Survey of the Education of Gifted Children*, Supplementary Educational Monographs, Chicago, University of Chicago Press, No. 83, November 1955, pp. 35–36, 75–76.

Probably the best-known example of segregation for specialized scientific education occurs in the Bronx High School of Science in New York. Here also, prospective students are carefully screened by processes which include written tests, scrutiny of previous record, and interviews. The student is given extensive guidance, has periodic conferences with the instructor, and may select from an extended curriculum in fields such as mathematics and the biological or physical sciences. Each course is liberally filled with laboratory work and each student is expected to do extensive outside reading, make reports, teach a class, participate in science exhibitions, hear speakers, and make special excursions.

Specialized schools of science are, of course, exceptions. The report of the previously mentioned United States Office of Education survey in twelve hundred secondary schools summarizes more common practices.[22] In the regular school teachers emphasize knowledge, accurate reporting of experiments, correction of superstition, development of skills basic to the study of science, and the development of qualities which lead to job success in industry. Rapid learners are more frequently encouraged to carry on experimental projects or research though there is no general use of individual progress methods such as contract plans or work sheets. Rapid learners are encouraged to study and to keep up to date on current science activity. They use scientific encyclopedias and references much more commonly than do slow learners.

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[22] Jewett, Hull, *et al., op. cit.*, pp. 49–59.

Teaching methods in science

Teachers who are successful in making provision for outstanding science students frequently allow these students to demonstrate in laboratories or to teach others. Eighty-five per cent of teachers assign children to conduct demonstrations which are nonmathematical, involve showing actual objects, or arranging materials for the class.[23] Almost an equal number use gifted students to coach less able individuals. Teachers who use this method argue that it teaches responsibility and that children who must explain clearly will learn the materials even more thoroughly. The delegation of duties is economical but invites the teacher to assign drudgery and simple time-consuming tasks to superior students. Properly controlled, the device has promoted scientific perception and learning.

After a visit to a dam and a powerhouse the children in Nancy's room were making a mural and a model. The teacher assigned Nancy to the group working on the model. Nancy urged that the dam should be built at a point where the river narrowed and where there was a fall. One of the other children said, "No, let's put it down here, near where we have the city."

Nancy said that she didn't think that it would be right, that you could make a much higher dam for less money if it were at a place where the river was not so wide. The other child felt that it made no difference whether the dam was high or not. At this point another of the children asked what the difference was.

The teacher said, "I think Nancy is right," and then, "Nancy, can you tell us the reason why the dam needs to be high?"

Nancy was uncertain but she said, "I don't really know. I do know that most very powerful dams are very high. I think, maybe, that it's because the water on top pushes on the water that's on the bottom and makes it stronger as it goes into the turbine—maybe it's like two people pushing instead of one."

The teacher encouraged Nancy to clarify her own thinking further by saying, "Well, let's imagine that you took out a long tubeful of this water and could have it stand up by itself—right here. Then would it be easier to explain?"

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[23] Garford G. Gordon, "How Good Teachers are Helping Superior Science Students," *The Clearing House*, 28, No. 4, December 1953, pp. 199–201.

"Yes," said Nancy, "it's almost like piling cans of something on top of each other. If I had a tin of coffee on my hand it would weigh one pound. If I put another tin on top of that, it would weigh two pounds and then if I put another tin on top of that it would weigh three pounds. That would press my hand down much faster than only one pound. I think the water from a high dam is more powerful. It goes through the penstocks quicker."

A little later in the same project, the children were making a model of the powerhouse. The teacher suggested that Nancy might make a model turbine and generator. At first she worked only on a cardboard turbine. She took this model home and returned next day with it completed. Her father had helped to build a small brush which was now attached to the turbine and set between two cardboard pieces which served for magnetic poles. In order to illustrate that the wires on the brush cut through the magnetic lines of force, Nancy had made a series of small pinholes in the cardboard magnet model. By shining a flashlight through, she was able to demonstrate that the rotating brush interfered with these "lines of force."

The teacher did not encourage Nancy to explain the model immediately but advised that she first read about the production of electricity. Nancy prepared as quickly as possible because she was eager to show the children the model and because the subject was exciting. On the following day she spent three or four minutes giving a formal presentation (not unlike teaching a class). The activity was effective for the class and for Nancy.

Another common characteristic of science education for superior children is a concentration on laboratory experience. Well used, the laboratory provides for "discovery learning." The principle is the same as that in mathematics. In order to assure that students understand physics and not merely have information about physics, teachers arrange opportunities for discovery learning. They help the child state the question or establish an hypothesis. Then they assist him in setting up an appropriate test or experiment. Of course, it must be clear that this is no recommendation for a cookbook laboratory nor is it any recommendation that every student should do every experiment. Gifted children infer or draw conclusions easily and they should be allowed to bypass activities where experience is not needed.

The laboratory approach and the physical setting of a science classroom may provide motivation. Children identify readily with the equipment and tools of science and if the laboratory is well used it provides a challenge to accuracy, objectivity, and logical thinking. In some cases the original preparation of the teacher, the urgency to cover all of the materials, or undue attention to routine rather than to exploration cause a fragmented and non-scientific kind of learning. It has been comparatively easy to convince both teachers and the public that relatively expensive space and equipment are essential to science and consequently school laboratories have been much changed in the last fifty years. Good equipment is desirable but even that may be poorly used.

Some years ago, because there was a minimum of equipment, teachers talked and read about science rather than involved youngsters in it. In most high schools, the laboratories are now well enough furnished so that all students get opportunity at least to watch demonstrations. In the elementary and junior high schools equipment is sometimes inadequate, but it would be a mistake to assume that the mere acquisition of equipment and the inclusion of laboratory courses will make scientists. Too much attention to laboratory technique or emphasis on repetition of non-exploratory laboratory exercises is no more productive than talk about science.

Individuation is necessary in science as in any other subject. Effective teachers of rapid learners arrange for students to act as assistants in class, organize laboratory or science club work, encourage recreational reading of science fiction, help to discover local problems for study in science, arrange for students to try competitive science examinations or aptitude tests, announce or discuss radio and television presentations of scientific interest, and stimulate students to plan or carry on projects of an experimental or research type. These are all forms of individuation. Obviously the successful teacher inspires the child to proceed on his own. These qualities are encouraged either through library research or laboratory experimentation in science.

Individuation is frequently encouraged through allowing the child to demonstrate or talk about his own interests. If a class should be studying winds the more intelligent one might make a cross-sectional model of continental air movements, construct an operating model of some of the instruments used for gathering weather information, or predict weather and then test the reliability of his predictions. In such activities, he should be encouraged to establish a better conceptualization and a deeper understanding of the phenomena.

Developing a scientific point of view

Infant responses are characteristically primitive, resulting in mass activity and unco-ordinated movement. Gradually, these responses become refined and the massiveness and the irregularities are reduced. In chapter 8 on learning we found that thinking and reasoning follow the same course from the diffuse and poorly organized, or chance to the refinements of reason and logic. This evolution is slow and it involves the total personality and intelligence of the individual. It is impossible to teach the scientific method apart from total development of the individual.

The relationship of scientific thought to the wholeness of the person may be illustrated by the fact that disorganization and fear result in hasty, immature or rigid judgment. In our review of learning we noted that immature and fearful persons respond in repetitive, non-learning, and limited patterns. Under extreme anxiety or intoxication subjects return to pathological and primitive thoughtways. These pathological responses are childish and non-scientific.

Successful science teaching seeks to produce mature and orderly thought. Young children give diffuse causes for their observations. They "guess" that the cause of a phenomenon may be anything within range of their imagination rather than anything which is both within their imagination range and appropriate to the situation. They do not perform the judgmental tests which are necessary to the establishment of a tested or scientific conclusion.

Young children also reason subjectively.[24] They explain phenomena in terms of their own feelings. For example, they may assure us that the dark comes because people are ready to go to bed. Development of more mature reasoning with an understanding of cause and effect and with less diffuseness and subjectivity is a major objective in the science curriculum. As a result of education and growth the child becomes more specific and more objective and these are qualities essential to scientific capacity.

Conditions which develop creativity in objective or quantitative fields have not been widely studied and are poorly understood. An extensive study by Anne Rowe, a psychologist, shows that early family relationships and emotional conditions are important in determining the specialty which is chosen by research scientists.[25] These scientists place high value on the influence of their homes, especially their fathers, or on the influence of a teacher. Research physicists and biologists admired their fathers and identified with them. The relationship was largely intellectual. Their fathers were remote and there was limited emotional responsibility between them and their sons. More frequently than social scientists, these natural scientists came from families which were marked by a somewhat austere intellectualism with few intensely close relationships to parents or to siblings. Apparently the sons found it easier to become immersed in the study of objects and things than in the study of human relationships.

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[24] Heinz Werner (translated by E. B. Garside), *Comparative Psychology of Mental Development*, New York, Harper and Brothers, 1940, pp. 319–326.

The data suggest that emotional factors operate to determine which of the specialized fields is chosen for a life work. Gifted children who do not relate well to people choose the natural sciences; those who are most anxious choose physics and the less anxious choose biology. Those who become social scientists seem to be raised under greater personal pressures. Like physicists they are anxious about human relations but they are less able to assume an aloof and guiltless position in emotional matters. The evidences are scattered and inconclusive but they indicate a valuable area for investigation.

Remoteness or introvertive qualities have been noted in some of the more successful students in current high school programs of science.[26] The meaning of this finding is not clear. It may only reflect the nature of a science course in a particular school and may be unrelated to the development of scientific attitudes. It is also conceivable that introverted high school students achieve recognition through turning energy into the objective sciences. It may mean that scientific thought and introversion support each other in some unknown way.

This view is supported by a study of 250 world-renowned researchers.[27] The investigator found the subjects to be intelligent, zealous, and humble but he found one negative trait which was identified as antisociability. Clearly, scientific pursuits demand dedication to the laboratory and may be facilitated by personal remoteness. These scattered observations do not provide proof that convivial persons with scientific interests are hampered by their congeniality, but insecure children with high-level intellectual ability may find autonomy and recognition in the intellectual tasks of the depersonalized natural sciences. There is no reason to believe that greatly withdrawn or remote persons will produce creative and orderly thought and there is no reason to believe that near-neurotic conditions are ideal for developing scientists. The same studies which reveal a mild tendency toward remoteness show that research scientists like other independent thinkers are essentially stable and interested citizens in their community.

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[25] Anne Rowe, *The Making of a Scientist,* New York, Dodd, Mead and Co., 1953, p. 231.

[26] Paul F. Brandwein, *The Gifted Student as Future Scientist,* New York, Harcourt, Brace and Co., 1955, p. 54.

[27] John R. Shannon, "Traits of Research Workers," *Journal of Educational Research,* 40, No. 57, March 1947, pp. 513–521.

One important conclusion drawn from the study of scientific researchers is that good teaching provides an early opportunity for students to accept responsibility. Almost invariably the subjects were thrown on their own resources at an early age and in many cases someone pointed out the value of discovering things for themselves. Some teachers encouraged independence; others simply neglected their students and this led to independence. The common element is that young scientists were left on their own to develop activities which were designed to answer questions. This evidence supports the contention that learning must involve the student. The organization of ideas and the conclusion are most valuable when reached by the student instead of told to the student.

This is consistent with our previous generalizations on learning which recommend the partially completed experiment, the student summary, and the unit or class sessions which begin with the large question. Involvement is most likely when the teacher or parent serves as a guide who points out the question rather than as the person who gives the answer.

Another conclusion which may be drawn from the Rowe study is that curiosity is the most vital of all scientific motivations.[28] The subjects are marked by a need to find out and it may be concluded that a major function of the teacher is to promote curiosity and to act less as the recognized and voluble leader than as one who points up the problem.

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[28] Rowe, *op. cit.*, p. 234.

The study of scientists also shows that they approach thought problems in different fashion from field to field. For example, biologists appear to use a great deal of visual imagery—thinking in terms of pictures. The images may be pictures of real things or of diagrammatic or symbolic things, but they are seen rather than said to oneself. Auditory-verbal images are much more common with theoretical physicists than with experimental physicists and very much more common with theoretical physicists than with biologists.[29] These findings back up our earlier observation that thought patterns do indeed differ and that these patterns are influenced by early educational and family experiences. Not only were the approaches developed in early childhood but research scientists were found to use methods common to their fathers. It seems safe to conclude that teachers should deliberately choose to teach a scientific method and that this teaching is appropriate in the early school or preschool years. It is an error to assume that scientific attitudes are developed primarily in secondary school and college.

There is no one scientific method but there are characteristic ways of problem-solving and these are much like the methods used in solving artistic problems. Among high school students, Brandwein found that scientific problems were solved in the following stages: exploration, clarification, preparation, incubation, illumination, and verification.[30] The stages are somewhat vague and indefinable but they involve processes which characterize creative thought with the first period marked by diffuseness and randomness. This first, or exploratory, period is followed by definition, a pointing up of the objectives or clarification. The second is a period of conscious work toward solving a problem and it involves the collection of data. In the third period, action is less obvious. The attempts at solution are less conscious and less active. The solution comes in a "flash," an "illumination" or insight. Then comes the final period, one of verification or testing.

The teacher's role in this process is obviously a more active one in the periods of clarification and verification. The student's activity is greatest in the periods of exploration and preparation. Nevertheless, the point of learning is at the illumination or at the solution. The best arrangements for learning in this process involve a unit which begins with exploration following the large whole view of the problem; the teacher assists the child in differentiating and specifying the point of attack. This stage is followed by preparation or by data gathering in which the student's activity should be observably high. In the following stages of incubation and illumination the teacher's role is largely one of encouragement, though from time to time it may be necessary for the student to drop back to earlier stages for reclarification or more adequate preparation. When a solution has been achieved the teacher's role becomes slightly more active in helping the student to evaluate his own performance. These stages are an application of the hypothesis-test approach to learning.

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[29] *Ibid.*, pp. 139–151.

[30] Brandwein, *op. cit.*, pp. 59–60.

Effective teachers emphasize the methods of inquiry.[31] They find in science a special subject matter which is based on investigation and cannot be known without an understanding of its basic methods. The child must know the observed phenomenon or the empirical facts but he must also be aware of the conceptual components which are involved in the conclusion drawn. Only then is he prepared for the constant revisions which are part of the scientific method.

Scientism is an attitude prized in our culture and developed largely through differentiating out of general observations the specifics which explain the cause or predict a result. In programs for the gifted there must be a concern with philosophy of science. Excellent teachers resist the temptation to teach information only. They catalogue and package the necessary facts but they do not allow this activity to deflect them from the primary goal which is teaching students to think and to understand the processes of thought. Excellent teachers encourage children to learn science not as a way of vocational efficiency but as a tool for understanding. They help the student examine the nature of critical thought, the fallacies of thinking, the flexibility in notions, the nature of good evidence, and all of the assumptions which underlie problem-solving.

Teachers who develop scientism find it necessary to promote "associative fluency." They encourage children to connect very remote associations with the content which is now under study.[32] They deliberately teach the child to associate things from one field to anther, to tie words and symbols together, and to leap easily from idea to idea. This associative fluency underlies ideational fluency and is encouraged by a good deal of free-swinging imagination in any field.

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[31] Joseph J. Schwab, "The Teaching of Science as Inquiry," *Bulletin of the Atomic Scientists,* 14, No. 9, November 1958, pp. 374–379.

Partly identical or closely allied with this characteristic of good science instruction is a tendency to relate science to other aspects of human knowledge. Gifted children can readily understand that Sputniks and H-bombs exemplify dangers which are encountered through scientific discovery. They can understand that the history of science has been intimately connected with war and destruction and that young scientists must be aware that either liberation or bondage may come with invention.

Gifted children need an introduction to problems which arise as a result of scientific techniques and automation or because machines change the relationships of persons or because an invention may deplete one of the natural resources. The implications of science to modern life are no less subject matter than are the facts of science itself. The goals of gathering information or the pursuit of individual curiosity are not enough. Good curricula must include scientific fact, breadth of understanding, ability to see the pervading problems of humanity, and ability to think searchingly and thoroughly. These things are proper to the education of both the gifted specialist and the gifted generalist.

Suggestions for science instruction

1. A general science course should precede the specialized courses of the secondary school. Physics and chemistry are fundamental to specialized training but they do not in themselves produce a broadly scientific attitude and they are not as competently learned by students who have not had a general science course. The "seeding of interest" and the development of a scientific view are facilitated by the functional approach and by the broad perspective of general science.

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[32] Robert C. Wilson, "Creativity," *Education for the Gifted: 57th Yearbook of the NSSE* (Nelson B. Henry, Ed.), 1958, p. 198.

2. Even in specialized high schools of science it has been found wise to avoid overspecialization.[33]
3. In the elementary and secondary schools, science courses should be essentially non-vocational.
4. Students with special abilities or interest in science should be offered a three-year sequence of biology, chemistry, and physics in the secondary school with elective opportunities in advanced chemistry, geophysics, microbiology, electronics, and field biology.[34]
5. Gifted students should sometimes touch the frontiers of science in order to be acquainted with challenges and methods.
6. High standards and specific information should be required. They are most readily demonstrated in the final phase of scientific activity which involves evaluation or testing of a conclusion.
7. Gifted students do not reject courses because they are "hard" in terms of intellectual requirement. They reject courses because they are rigid or because the teacher lacks sympathy and warmth.
8. Good science instruction requires the individual student to be responsible for a laboratory experiment or for the definition of a question. It increases his willingness to put in effort and to begin again after failure.
9. Students are given differentiated assignments. When the average child is expected to demonstrate that air has weight, the gifted child may be required not only to demonstrate that air has weight but to demonstrate a means for weighing it.
10. Special grouping is appropriate in advanced science courses.
11. The laboratory is used as a place where the student can work ingeniously and at nearly his own speed.
12. Successful elementary programs are sometimes built around a "work center" or a "science corner" in which experimental materials are made readily available to the student.

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[33] Morris Meister, "A High School of Science for Gifted Students," *The Gifted Child* (Paul Witty, Ed.), Boston, D. C. Heath and Co., 1951, p. 219.

[34] N.E.A. Project on the Academically Talented Student and National Association of Science Teachers, *Science, for the Academically Talented Student in the Secondary School,* Washington, D.C., National Education Association, 1959.

13. The role of the teacher is that of adviser, helper, and intellectual guide. He points up the teasing quality of scientific questions.
14. Successful science teachers are competent in science and they are marked by unusually successful relations with children.
15. Community members who have scientific interest or scientific training are encouraged to participate in the school program, and to create both enthusiasm and understanding. The teacher acts as a liaison between the student and the community scientist who brings special skills and provides an excellent model or identification object.[35]
16. Effective science teaching is sometimes accomplished by requiring children to prepare a demonstration or an experiment so that it can be understood by their classmates.
17. Responsibility and perception of consequences is increased by applying the study of science to local problems or to world problems that have current interest.
18. Children are encouraged to observe closely and remember. This is frequently accomplished in nature study where children are asked to reproduce things they have seen.
19. Manipulation of equipment is not a substitute for thought. The cultural emphasis is on mechanics. Nevertheless one of the greatest insights into the mystery of radioactive energy came from Einstein's formula $E=mc^2$. Scientific education values hypothesis-forming as well as experimentation.
20. In any subject matter or unit the teacher encourages the child to see the scientific question. For example, in social studies the child might be encouraged to postulate a scientific solution for a famine area of the world. When younger children are studying the fire department, some of the able ones might study chemical principles of the home fire-extinguisher.
21. The "brainstorming" technique is useful. A problem or situation is posed and children are encouraged to write down or to describe as many ideas as they possibly can. The tangential or "wild" idea is not frowned upon because it is the intention to

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[35] Jeff West, "Science Gifted Work with Local Scientist," *The School Executive*, 78, No. 1, September 1958, pp. 74–75.

produce ideas which have only remote association. Evaluation of the ideas and suggestions is delayed so that ingenuity and creativity are not squelched.

22. Students are asked to improvise scientific equipment or to improvise a new use for an everyday product. This encourages sensitivity to problems and adaptive flexibility to ideas.
23. Scientific thought is stimulated by describing a situation or an experiment and then requiring children to describe what would happen if one of the conditions should be changed.
24. Teachers ask questions to stimulate scientific creativity. What would happen if the sun burned out in a period of one hundred years?
25. Good programs emphasize the close relation of science and mathematics.
26. Successful schools provide opportunities to read in science. They bring together the unusual capacity to read and the natural curiosity of the gifted child.
27. Good programs begin early and arrange continuity between elementary and secondary.[36]

General Conditions for Academic Courses

Practices which are adaptable to intellectually superior children are remarkably alike from subject to subject. These practices are least frequently seen in schools which hold that elementary school is a preparation for high school, that high school is a preparation for college, and that college is a preparation for professional school. This "in line" and "on schedule" approach to curriculum produces enslavement to narrow, repetitive, and non-imaginative learning.

Successful programs in the traditional academic disciplines are marked by some of the following characteristics.

1. They have comparatively few but well-organized and non-compartmentalized courses which allow extension into unusual mathematical applications or truly exploratory scientific ideas.

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[36] A. H. Passow, "Developing a Science Program for Rapid Learners," *Science Education*, 41, No. 2, March 1957, pp. 104–112.

2. Discovery and creativity are encouraged as outcomes from the total educational experience and not from one course. It has often been noted that art and science or mathematics and literature flourished in the same period and frequently among the same group. Modern students find a remarkable similarity between the artist and the scientist in both motivation and method.[37] To promote inventive outcomes schools emphasize observation, independence, the unity of ideas, and the value of relationships, not just facts. They adapt methods which were first tried in the artistic subjects: (*a*) thorough acquaintance with a subject, (*b*) speculation or hypothesizing, (*c*) withdrawing or relaxing to encourage insight or illumination, and (*d*) conscious criticism. Challenge is prized and students are encouraged to introduce unusual questions, try new proofs or propose a review of rejected hypotheses.
3. Attention is given to self-discovery and involvement with a requirement for high standards. Efforts are made to assure that standards become those of the student and do not remain forever those of the teacher. Consequently, the programs encourage self-monitoring, self-checking, and self-evaluating.
4. In all subjects, communication stands out as a dramatic necessity. Interchange of knowledge is fundamental to scholarship, the individual, and society. The development of communication skill is so inherently part of growth in any subject that all teachers make language a matter of major concern.
5. Special sections of courses or classes are most frequently found in the quantitative subjects (mathematics, science, physics, algebra) where sophistication with its specificity and exactness would exclude less than averagely able students from discussion set at levels appropriate for gifted students.
6. Elementary and high school courses are not highly vocationalized. For gifted students vocational training is ordinarily delayed to the college or postcollege period. Schools recognize that extremely functionalized values may overemphasize contempora-

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[37] See J. Bronowski, "The Creative Process," pp. 58–65, Paul R. Halmos, "Innovation in Mathematics," pp. 66–73, Freeman J. Dyson, "Innovation in Physics," pp. 74–82, and George Wald, "Innovation in Biology," pp. 100–113, all in *Scientific American*, 199, No. 3, September 1958.

neousness and immediate practicality causing the particular educational activity to be a terminal one.

7. Teachers serve as models. They control less from authority than from the stimulation of their ideas or the soundness of their judgments. For them, teaching is structuring of learning opportunities more than telling answers.
8. The measures of accomplishment are varied and the child frequently participates in their application. Though standardized and teacher-made tests are used, successful teachers are aware that the criteria of success include such items as (*a*) increased love of learning shown by aroused curiosity or by willingness to do independent research, (*b*) increased ability to think and to understand the assumptions and the processes which underlie conclusions, (*c*) increased individual differences with gifted students becoming more and more unique, and (*d*) increasingly accurate judgments of capacity made by both teacher and student.

14

Parents and Teachers

Nothing in the home matters as much as the parents and nothing in the school matters as much as the teacher. Parents and teachers as surrogate parents are dynamic influences in the child's life. They help set goals, assist in establishing values, select learning experiences, choose methods, and serve as examples or models.

Selection of teachers

There is little documented evidence to prove that generally excellent teachers would not also be excellent teachers for the gifted. Human qualities, the ability to individuate, and professional insight are needed for teaching the dull, the average, and the gifted. Genuine competence in teaching with personal willingness to accept all children is a more valuable asset than a narrow enthusiasm for the gifted group. One writer has suggested that the teacher of the gifted should be modestly brilliant, avidly enthusiastic for learning, thoroughly competent in educational method, and devoid of jealousy or selfishness.[1] Other lists are even less functional because they describe qualities of extended number and great generality. These lists include a strong personality, tact, health, openmindedness, alterness, interest in children, industry, thorough training, excellent discipline, previous teaching experience, compelling personality, special training, and other desirable attributes.[2]

Ideal conditions and ideal teaching are rarely achieved but it is reasonable to expect teachers of the gifted to have special competencies. They must use selective methods to teach a special curriculum for children who are marked by fundamental learning differences. This view is not universally accepted. It has been contended that there are no special methods for teaching rapid learners and that the only possible adaptations are changes in emphasis among certain commonly used methods. From this position, it has also been proposed that the teacher may be comparatively unimportant in the education of gifted children because the pupils have incentive and capacity to pursue learning independently.

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[1] Herbert A. Carroll, *Genius in the Making,* New York, McGraw-Hill Book Company, Inc., 1940, pp. 262–263.

[2] John Edward Bentley, *Superior Children, Their Physiological, Psychological and Social Development*, New York, W. W. Norton and Company, 1939, p. 181.

The most common approach to definition of qualifications for teachers of mentally superior students has been through questionnaire studies in which gifted people, or graduates of gifted programs, have been asked to point out the qualities of excellent teachers. The respondents list items such as sense of humor, encouragement of responsibility, knowledge of the subject, firmness and fairness, understanding of children and enjoyment of teaching. Opinions from gifted children should be comparatively accurate and perceptive but this list does not contain any item which would be inappropriate for a description of good teachers in the general classroom. Another descriptive list includes co-operative democratic attitude, kindliness and consideration for the individual, patience, wide interests, pleasing personal appearance and manner, fairness and impartiality, sense of humor, good disposition and consistent behavior, interest in people's problems, flexibility, use of recognition and praise, and unusual proficiency in teaching a particular subject. Like the previous list, this one contains no item which might not be used to characterize the good teacher regardless of assignment. Gifted grown-ups who responded to these questionnaires agreed that no person is likely to combine all perfections and that teacher-fitness depends more on the large human qualities than on any specific and fixed characteristic.[3]

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[3] For example see: Nelda Davis, "Teachers for the Gifted," *Journal of Teacher Education*, 5, No. 3, September 1954, pp. 221–224; W. Carson Ryan *et al.*, *The Gifted Child* (Paul A. Witty, Ed.), Boston, D. C. Heath and Company, 1951, p. 107; and Marcella Ryser Bonsall, "The Significance of the Gifted Child in the Elementary School," *The Gifted Child in the Elementary School*, 26th Yearbook, California Elementary School Administrators Association, 26, 1954, pp. 1–14.

A list of teacher characteristics which are peculiarly important in education of the gifted includes the following:

1. *Ability to use laboratory and workshop methods.* The teacher must be competent to use workshop or guidance methods with students who learn in a hypothesis-test fashion. The unified or integrated project demands resourcefulness because procedures and patterns are not completely organized or rigidly controlled. The teacher must be able to accept and encourage variability, deal with non-conforming opinions, and avoid intellectual competition with students.
2. *Competency and a zest for learning.* Intelligence is an attribute of the good teacher regardless of the level of pupil intelligence. Pupils are not taught best by one who is like them but by one who understands or is empathic to them. The learning situation is most adequately arranged by a teacher who knows the student's background, perceives the student's pattern of thought, detects the student's errors, and senses the student's motivations. Useful changes in behavior are achieved by teachers who have enough insight to structure or to arrange learning situations in a fashion which involves the student. This structuring requires a complex and mature understanding of the learner and of the subject matter. A teacher may have ability to structure or arrange learning situations because he approaches the task with unusual brilliance or because he approaches the task with some brilliance and a good deal of useful education and experience. This does not imply that the teacher of the gifted must know everything. The teacher must be interested and alert and must have a variety of knowledges and a depth of understanding in some subject matters. These qualities are essential to good teaching whether they arise from native intelligence or from learning. They will be enhanced if the teacher has a capacity to think critically, discuss well, seek out information, and arrange or present facts when they are found.
3. *Ability to understand and recognize gifted children.* Certain teachers do not discover giftedness and are uncomfortable with gifted children when they are found. Probably their unhappiness

in working with superior children contributes to their inability to locate and teach them. Some of the alienation may result from feelings of inferiority and from incompetence, but more important is the hostility which arises because the teacher is conceited and determined to display personal intellectual brilliance. The teacher who is immaturely involved with demonstrations of intellectual prowess is not open to problem-solving and research approaches to teaching. A dramatic display of the teacher's intelligence limits student participation and the learning opportunities which are available. The teacher who is threatened by feelings of inferiority and the one who is driven to feelings of superiority alike fail to recognize special abilities or to perceive individual needs. Their need to control and dominate the situation interferes with teaching gifted students who are eager, comment freely, and learn from wide-ranging questions and activities.

4. *Effective teaching techniques.* Uniqueness is a major mark of creativity and high intelligence. It is much less possible to say that there is a "gifted type" than it would be to say that there is a "dull type." Therefore, it is less possible to say that there is a type of teaching or a method which is appropriate to gifted students in the same degree that one might say that there is a method or a technique which is appropriate to dull students. The cultivation of this uniqueness or superior capacity requires teaching which is characterized by versatility. Some teachers who are admired for orderly, step-by-step, drill-oriented teaching are particularly inept. Neither does success come from hit-and-miss variations of technique. The effective teacher must have a mature relationship with children and highly developed skill in individualized instruction.

The list of general qualifications might be extended by adding several more or less definitive requirements. It should be hoped that the teacher of the gifted will be creatively philosophic and possess a mature and attractive personality so that he may serve as a human model. To be adequate, he will have intelligence, will know the subject, will not pretend expertness which he does not possess, will not be jealous and competitive and will not be listless or pedagogically incompetent.

Unfortunately, very little special work has been done in the selection and training of such teachers. A 1951 survey reported that twenty times as many colleges provided special teacher-training in remedial speech as in teaching for the gifted. The ratio is more notable because approximately 1.5 per cent of children were speech-handicapped and 2 per cent were intellectually gifted.[4] School administrators who have indicated some willingness to employ specially trained teachers find few available. Lack of special preparation is probably due in part to the scarcity of programs for training and certification, in part to the few classes offered in regular programs, and in part to the lack of agreement on which are desirable qualifications for the teacher to possess.

Training opportunities are being expanded, though few programs are as complete and orderly as those offered for teachers of the retarded. Pennsylvania issues a state certificate for teachers of the mentally advanced and has established requirements for this certification. Specific requirements include a course in arts and crafts, a course in methods for the mentally advanced, and a student teaching experience in a class for mentally advanced children. A candidate also selects from certain electives which are frequently included in other specific or general certification programs.[5]

The influence of the home

Teacher-training alone does not assure a suitable adult community for the gifted pupil. The child who is more mature than his chronological age mates is peculiarly dependent on adult relationships. The Stanford studies have shown that gifted children, more than average children, sharply resemble their families in matters of attitude and interest. It is evident, also, that these families differ from the average in important ways.[6] Many of the parents and grandparents were eminent in some regard and generally they held posts of considerable responsibility. Though not wealthy, the parents were in comfortable circumstances. They worked in the professions, public service, and commercial occupations and lived in communities rated slightly above average. They had covered about twice as many school grades as the average adult and the home conditions were reported unfavorable only about one-third as often as for children in general. The homes were less likely to include imperfect parental control, undue severity, or below average mentality, and more likely to include cultural opportunities and systematic home instruction.

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[4] Frank T. Wilson, "Suggestions for the Preparation of Teachers of Gifted Children," *Elementary School Journal*, 52, November 1951, pp. 157–161.

[5] Davis, *op. cit.*, p. 223

[6] Lewis M. Terman *et al.*, *Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius*, Vol. 1, Stanford, California, Stanford University Press, 1925, pp. 55–111.

Home conditions of the gifted children were slightly superior to those for control children but the emotional conditions were not always ideal. The Terman studies and others indicate than many parents of gifted children are involved in a vigorous struggle for economic and social success. This may produce parental resentment of responsibilities and cause neglect and misunderstanding of the independence which is characteristic of early maturing children. Some of the parents failed to provide happy, pleasant associations and some imposed adult goals on the child's interests. The slight advantage in material comforts and the quality of neighborhood may not compensate for family neglect or social isolation.

Gifted children have ability and interest in organizing ideas and discovering through conversation. For conversations which are complex enough to contribute to learning they must turn to the adult. The children described in this book enjoy many conversations with their parents. Stephen searches out exact and scientific information. He is fortunate that his parents are well enough read and well enough educated to provide a testing ground for his ideas and to provide a standard for his language development. Nancy and Kathy participate in many adult conversations and they talk about a wide range of topics with excellent understanding. Pete illustrates the gifted child's range of curiosity and philosophic depth as well as dependence on adult relationships. Before he was five years old he wanted to know why people wore bathing suits and whether or not these were useful or merely "a kind of decoration." At another time he mused, "I don't suppose you could build a house on the water. Maybe you could build it while the tide was out and then when the tide came in, it would be on the water, but you'd sure have to work awfully fast."

Pete often explores serious questions such as, "Are we going by the place where they bury people and send them up to God? What I'd like to know is how they get up to God." Adequate parental responses to these queries require a responsible attitude and occasionally onerous attention if the parent is not to miss the point of concern. Some of the discussions are long and boring but they are essential to the child's thinking and development.

Gifted children are curious and have a desire to solve problems dealing with destiny and origin. Many of their conversations involve childish social and moral problems. On one occasion Pete's mother was reading aloud from a story which contained a moral intended to inhibit the taking of the largest, the best, or the last piece. On the story's conclusion, Pete frowned and remarked, "That doesn't make much sense. If you did that no one would ever get the best or the biggest piece."

Not all of the discussions are directed to the correction of selfishness and immaturity. Gifted children have considerable insight and understanding of social relationships. Pete's mother remarked that a certain man who was deaf talked as if everyone else were deaf also. Pete asked, "In what way do you mean, Mother?" His mother explained that the man talked very loudly and Pete concluded, "Maybe he wants to hear what he is saying."

Many of the conversations introduce natural philosophical questions. On one occasion Pete was talking with a little girl who claimed to have an invisible white horse. Pete said it was not invisible. On her insistence that it was, he said it could not be. The exasperated friend shouted, "It is too, because it's a pretend horse."

At this point Pete concluded, "That's just what I mean. A pretend horse is neither visible nor invisible. It's just nothing."

Such discussions are part of the expected self-dependent experimentation of the gifted child. There is a genuine need to discuss unusual and imaginative topics. Typical of these subjects is the fanciful discussion which was carried out by Pete when he said, "Do you know what I think the stars are? I think the whole sky is yellow with an iron shield painted blue over it. Then when it's cold and clear, the blue shield cracks and the yellow shines through."

Talking experiences are extremely important in the development of the able child. Reading and talking are especially significant when the child may participate with alert adults. Suitable parents and teachers are marked by abilities to discuss and listen. They talk with children. Stedman concluded that the one factor which contributed most to the development of gifted children was talk with parents.[7] She urged open friendly conversation in which the adult respected the child's opinions and helped to probe the unknown.

Home-school co-operation

A little more than a century ago it was common for noble or wealthy persons to take precocious children as protégés. They enriched surroundings, hoping to encourage the fullest development of children, and were rewarded by reflected glory or by feeling that their efforts had contributed to society. In modern times the culture of precocity is left to the parents and to the school. In many cases, the undertaking is halfhearted because parents feel that gifted people are peculiar or queer and that their unusual qualities should not be further developed. Other parents have such little understanding of creativity and uniqueness that they feel totally incompetent to encourage intellectual development.

The teacher and the parent must work together as resource persons. Their success depends on good communication, and this is not achieved without planning. Elementary teachers find the parent-teacher conference a "must." These conferences are particularly important in the elementary school because at this level there is less surrender to mass education. The conference is less highly valued in high school where the program is slightly more dehumanized, considerably more standardized, and frequently tied to narrower academic objectives. At any level, the gifted student is marked by uniqueness, and effective communication concerning him is best achieved in a conference.

One of the older school devices for interchanging ideas and providing communication is the report card. This is a useful tool in summarizing academic performance for average children but the majority of gifted students succeed in all subjects and their grades tend to be *A*'s with a few *B*'s. For them report cards become repetitive and carry little information. Despite a great deal of effort which has been spent on reporting, the cards fail to communicate the subtle information which is proportionately more significant with gifted students, who are almost universally successful in gross terms.

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[7] Lula M. Stedman, *Education of Gifted Children,* Yonkers-on-Hudson, World Book Company, 1924, p. 185.

In some schools the parents and the teachers have joined together in special study groups. This idea has often been applied to other out-of-norm classes. These groups may be less time-consuming than numerous individual conferences and they should be more communicative than report cards.

Identification of giftedness is best achieved through home-school co-operation. Intelligence is most accurately discovered in the school but this may not be true for the identification of other special abilities. Even in the matter of intellectual giftedness the school is greatly assisted by parental observations. These observations, revealed through interviews and conferences, provide a valuable check on screening instruments used in the school. Screening and identification techniques which involve the parent also pave the way for better planning and for more orderly continuation of the child's education in the home.

Ordinarily, parents know that their child is gifted but the school must discuss the degree or quality of this attribute. Most schools avoid discussion in terms of IQ because the numerical score may be misused or because a numerical score has little meaning to the parent. The mental age concept is more functional. It assists the parent in perceiving discrepancies between chronological age and physical age or between physical age and social age or between social age and intellectual age. These differentials are valuable insights for parents who will set tasks for their children. For example, Nancy's social-philosophic age seems to be greater than her academic age but Kathy's academic age may be above her social-philosophic age. This might be interpreted to mean either that the academic motivations or the academic opportunities are not great enough to meet Nancy's needs or that her social-philosophic motivations are very strong. In any case, the discussion of these differentials may be helpful and enlightening to parents. Another device used to define a pupil's intelligence with his parents is listing of possible or appropriate tasks. The teacher and the parent contemplate which tasks are adapted to the intellectual level, which should be avoided because of limited physical development and which are practical in the social situation.

Through such considerations they arrive at reasonable expectations.

Home-school co-operation provides an opportunity for the parent to discover how the child thinks and learns. The teacher and the school are expert in these matters and they sometimes forget that things which seem simple to professionals may be difficult to parents. There are numerous pamphlets and articles suited to lay reading. *Bright Children*, by Norma E. Cutts and Nicholas Moseley, and *Your Gifted Child, A Guide for Parents*, by Florence N. Brumbaugh and Bernard Rostico, are written especially for parents.[8] Several other books are adaptable to parents' use. In conferences, through mimeographed statements, through study groups, and through a variety of other devices, parents of gifted children may be helped to understand what is happening in the school and particularly helped in selecting home instruction suitable to their own youngsters. The child's learning situation will be enhanced if the parent has increased understanding.

Consideration of these topics must sometimes involve the teacher in mild controversy with the parent. It will do little good to discuss parental errors unless there is interpersonal respect. The suggested conditions for learning may imply criticism of the home, and acceptance of these conditions may require that the parent abandon previously held beliefs. Cutts and Moseley illustrate this problem in the case of families where both parents are working.[9] Many of the parents feel that they are sacrificing themselves in order to assure economic means for advanced study. Frequently, they are sacrificing the child's security which is developed in the early years and which is developed through extensive acquaintance with a mother. The advantages of security may outweigh the advantages of accumulated funds. This is particularly true for gifted children because they are capable of earning much of their own way in college and they are likely to receive fellowships, scholarships, or assistantships. Even though natural ability should be very great, if it is embodied in a disorganized and unhappy person it is rarely developed. Unhappiness in the early years may well make the accumulation of funds for higher education a futile and unrewarding enterprise. There are no rules which show that both parents should never work but this is typical of the many problems which must be judged in relation to the individual child and to the family.

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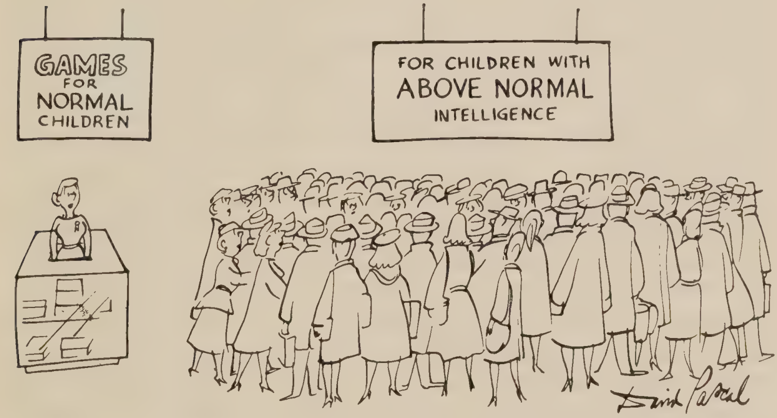
[8] Norma E. Cutts and Nicholas Moseley, *Bright Children*, New York, G. P. Putnam's Sons, 1953; and Florence N. Brumbaugh and Bernard Rostico, *Your Gifted Child, A Guide for Parents*, New York, Henry Holt and Co., 1959, 182 pages.

[9] Norma E. Cutts and Nicholas Moseley, *Teaching the Bright and Gifted*, Englewood Cliffs, Prentice-Hall Inc., 1957, pp. 162–169.

Exploitation is one of the parental errors most frequently calling for professional guidance. When teachers help parents to set standards they must sometimes resist the parental desire to impose standards and goals. Anxious parents, climbing the ladder of success, frequently tend to see giftedness in their offspring as a tool for power and accumulated success. Such parents distort growth by accepting the view that the child is "all in the head" and by demanding narrowly focused vocationalized academic interests.


GAMES FOR NORMAL CHILDREN
FOR CHILDREN WITH ABOVE NORMAL INTELLIGENCE
David Pascal

Courtesy *Maclean's Magazine* and David Pascal

Public display of child prodigies at the turn of the century caused a revulsion against public programs and performances of childish ingenuity. Cupidity and spectacular rewards on radio and television quiz shows now seem to have repopularized this form of entertainment. Some shows are careless about children's welfare and others are marked by little sound knowledge of children's thinking or learning patterns. In most cases memory is rewarded as though that were the epitome of intellectual prowess. Schools may help parents to determine which of these activities are suitable and which are damaging to their children. However, it is probable that public and commercial exploitations are proportionately small when they are compared with parental boasting and with parental demands for the child to achieve goals which have always been the ambition of the parent.

Those who espouse the fullest development of each child soon become aware of the importance of an enriched home environment. The home provides many of the opportunities for unique or individualized activities in which gifted children learn initiative. Parents and families with well-developed hobby interests provide stimulating environmental contacts. Such families read and discuss with children. They encourage games that require thought and they participate in the organization of thinking and in the determination of values. Schools can help to develop this productive environment by recognizing and by encouraging the home to become the most vital opportunity available to the child. The warm, active home in which adults participate in the intellectual activities and in which the child is encouraged to draw, paint, sing, and understand is the source of enduring motivations and of complex conceptualizations which cannot be provided in the school.

Parents sometimes encourage individuality and responsibility by providing the child with a creative center in his own home. The center can be simple but large enough to accommodate one or two friends who wish to participate. It should be supplied with quantities of rough paper, some records, choice books, hand tools and other simple and inexpensive materials. The provision of very complete toys, assembly kits with detailed instructions or canvases already plotted out for color will defeat the purposes of this center. These are inappropriate to the goal of creative, responsible, and independent behavior. The child should become increasingly responsible for this area of his home and should be expected to care for it, though the standard of care should not be so adult as to inhibit a sense of possession and independence.

An important function of the home is to maintain the normal responsiveness of gifted children. More than others, they are sensitive to the feelings of younger and older people and they reflect the emotional attitudes which are about them. Under inadequate emotional conditions gifted children fail to develop the social perceptiveness of which they are capable, and they never accept the responsibility which society hopes they will assume. The happy and congenial family is a place in which children learn happiness and congeniality and these are qualities which bring talent and ability to fruition.

In conjunction the home and school provide many services which are superior to those which can be provided by either institution alone. Typically, the two agencies working together are effective in discovering and fostering interests. Conversation with parents stimulates children to mature thinking, to intellectual interests, or to examine vocations. Child and parent discover enduring interests. The school discovers the same interests through essays, discussion, and tests. These interests can be furthered through community visits, library projects, Saturday art classes, science clubs, special reading sections in the library, field trips or other exploratory activities. School guidance personnel as the most highly trained resource persons naturally have a responsibility in helping parents to select books and materials which will eventually help the child to formulate a vocational plan. They have a responsibility to lend guidance to public libraries or other community agencies which serve children in intellectual or artistic matters. They have a particular responsibility to assist the child in discovering his aptitudes and in making occupational choices. These responsibilities are readily evident in vocational preparation but are equally inherent in academic and social development.

Typically, children today, both dull and gifted, are interested in rockets. Parents may assume that backyard dabbling or experimentation with explosives constitutes a truly intellectual enterprise. In fact, many of the activities are no more intellectual and creative than is whittling. Unguided, this interest leads to manipulation and to gadget-handling and is unimportant in the development of the competent professional scientist. A good understanding between the home and the school makes discussion of these issues possible.

Effective communities provide a good relationship between the community, the home, and the school. Out-of-school agencies provide for displays of hobbies, discussions with scientists and artists, special programs in music, displays in museums, and interest activities. These services are most likely to be well co-ordinated and effective if there is leadership from the school. School people can help to co-ordinate the summer studies, the Saturday art classes, and the other activities which are possible within each community.

Like the school, community agencies are pressured to provide for everyone and they tend to provide a single bill of fare. If they have special opportunities they open them only to those who have previously demonstrated talent or ability. It would frequently be more appropriate if they cared less about performance and more about range of opportunity. As the trained agency in the community, the school should offer leadership which avoids well-intentioned but uninformed expenditure of prodigal enthusiasm on poorly evaluated and poorly designed projects.

The close relation between school and community programs is apparent in the work of the Quincy (Illinois) Youth Development Commission. The community, with assistance from the Committee on Human Development at the University of Chicago, has undertaken an ambitious project designed to help all children who are in need of special opportunities.[10] First those who can profit from special help are identified. Then a corps of local residents undergoes nine months of special training and serves in teams to improve the opportunities for a particular child. The university's role is one of consultation and evaluation, leaving the responsibility to the community.

In an effort to place all children "on the conscience" of the community the Quincy project naturally seeks to discover talent which might not ordinarily come to light. Because tests are inadequate or because talent may be suppressed by the environment, many able children are not discovered without an organized search. The project further seeks to discover the conditions which motivate the development of natural abilities and is making special efforts to assess the effects of class differences, family needs, and community expectations in the development of ability.

It is fairly clear that educational services can be enhanced by community activities which are well designed. Community programs have contributed especially in drama, dancing, scientific learning and music.[11] Children's museums, children's little theater, special YMCA clubs, and similar activities complement school activities. They contribute most of the development of social leadership, artistic talent, and other special competencies which probably require a large element of intelligence. Where these programs are effective they are characterized by established organization, long-term plans, planned financial support, and deliberate training of adult personnel.

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[10] Robert J. Havighurst, Robert F. DeHaan, William J. Dieterich, Henry Hackamack, LaVona Johnson, and Robert D. King, *A Community Youth Development Program*, Supplementary Educational Monographs, No. 75, Chicago, University of Chicago Press, 1952.

[11] Jack Kough, "Community Agencies and the Gifted," *Education for the Gifted, 57th Yearbook of the NSSE, Part II*, (Nelson B. Henry, Ed.), Chicago, University of Chicago Press, 1958, pp. 377–394.

Planning for children of superior ability must be guided by the realization that a first sense of security, a first determination of values, a first pattern of thought, and a first setting of goals comes from the home. These are modified, enlarged, and enriched by school experiences but they are not supplanted. To be effective, agencies must work together in building and enlarging on home experiences rather than attempting to start on another foundation.

15

Vocational Planning

In a complex specialized world when the frontiers to readily usable land have been crossed, intellectual resources must be effectively used. Current social problems and military challenges increase awareness that there is a limited reservoir of available and trained intelligence. Current demands for specialized and creative workers must be met from a generation limited in numbers by a low birth rate and limited in advanced training by an economic depression. The economic and social conditions of the 1930's were inadequate for the full development of human potential.

A society faced with these shortages should examine how present conditions will affect the supply of human resources in the next generation. In the first half of the 1950's large numbers went to college but degrees were secured by less than half of the ablest 25 per cent and by less than two-thirds of the most promising 5 per cent among all high school graduates.[1] Even though 40.4 per cent of Kansas high school graduates went to college in 1955, only 61 per cent of the valedictorians and salutatorians entered the lists of higher education.[2] The college population in the United States surpassed three million but approximately one hundred thousand among the top third of high school students failed to go to college for economic reasons.

Society must be concerned with the advanced training, the vocational choices, and the occupational successes of intellectually competent students. By 1945, Terman felt that he had proved his hypothesis that IQ level is one of the most important facts which could be learned about a child.[3] A quarter century after their selection solely on the basis of intelligence, the subjects of the Stanford studies were engaged in professional occupations nine times as frequently as could be expected. During the depression they had been unemployed about a fifth as much as men in general and they earned seventy-five hundred dollars or more eight times as frequently as the national standard.

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[1] Dael Wolfle, *America's Resources of Specialized Talent, A Current Appraisal and a Look Ahead*, New York, Harper & Brothers, 1954, p. 8.

[2] Charles C. Cole, Jr., "Scholarship Applicants Today," *College Board Review*, Spring, 1057, No. 32, pp. 17–20.

Part of the economic and vocational success which characterized the Stanford group must be attributed to the fact that 70 per cent were college graduates. This is a figure ten times greater than the California population of corresponding age. The group also had a more intensive education with 29 per cent rather than 2 or 3 per cent earning a graduate degree. Since this group came to adulthood in a period of depression the large number who secured Ph.D.'s, M.D.'s, and other advanced professional training must be attributed, in part, to the fact that one in five held undergraduate scholarships and more than one-quarter of them received graduate fellowships or graduate assistantships.

A positive relationship was found between occupational status and IQ. The gifted men had surpassed the occupational status of their fathers with 45 per cent in the professions; this gives a ratio of eight-to-one when compared with California males. Approximately 71 per cent of the gifted were in either Group I (professional) or Group II (semi-professional) or in the managerial business occupations, as compared with 13.8 per cent of California men in general. This is a ratio of five-to-one. Not as many were in clerical and retail trades, farming, semiskilled occupations, slightly skilled occupations, or day labor.

Economic success and occupational status are inadequate standards for judging human success but the relation between success and earnings cannot be ignored in a competitive system. In these narrow limits, gifted students are successful, though the causes for their successes are little known. The success related to intelligence is greater for certain religious groups, for the graduates of prestige colleges, and for those who do not have to earn their way through college. Vocational success depends on many conditions and guidance is very complex.

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[3] Lewis M. Terman, *et al., The Gifted Child Grows Up, Twenty-five Years Follow-Up of a Superior Group, Genetic Studies of Genius,* Vol. IV, Stanford, California, Stanford University Press, 1947, pp. 170–195 and 358–372.

Vocational guidance

Terman indicated the dangers in haphazardly or impatiently selecting a vocation. Gifted children are interested in everything and their development is characterized by sequential waves of interest. It is a common mistake for parents and teachers to interpret these interests as significant and to insist that the child shall prepare for a career on the basis of the current enthusiasm. Because these children are competent they can be molded into a career whether it is the most appropriate one or not. Geniuses show early indications of their future avocational and vocational interests but these have been noted more through hindsight than through foresight. Planning for dull students must be early in order that they adapt to limitations. The gifted on the other hand need make no early or inflexible choices.

The major concern should be with providing good work habits, enthusiasm and opportunities to explore occupations. The gifted child has a special need to avoid a high school curriculum which is terminal and leads unalterably to certain occupational choices. If he chooses a vocation too early, he finds himself held to a decision because it is expensive and time-consuming to undertake training necessary for a more demanding or more challenging occupation. A career choice need not be made prior to the senior year of high school. For gifted children the vocational field is open and vocational planning should assist primarily in developing skills of self-evaluation, vocational knowledge, and willingness to formulate a plan.

Vocational planning for gifted girls is more complex than planning for their brothers, since there are numerous social problems involved. The girls are characterized by the same wide range of possibilities and many of them may prefer vocations which are currently characterized by a paucity of female workers. While such choices might be extremely hazardous for average or for dull girls it is entirely probable that a gifted girl can be employed and can achieve success in most fields.

The guidance worker or "occupations" teacher is short of tests and source materials specifically suited to gifted students. Nevertheless, the schoolworker is the best guide available. He is best informed on opportunities and most aware of the pressures which come from homes or from recruiters in business, the armed services, and colleges. Even the school may seek to build a reputation by arranging advanced opportunities for the student. The guidance worker may be in the most unbiased position. His training and his schoolwide responsibilities as well as his primary responsibility to the student should help him to be objective and realistic.

"Boys and girls, this is Mr. Smythe of the Universal Aircraft and Missile Corporation. He wants to tell you about the advantages his company has to offer the graduating engineer."

(Illustration courtesy of *Better Homes and Gardens* magazine.)

The temptation to make very exact choices should be tempered with the realization that even among highly specialized persons there are shifts from one occupation to another. Under the pressures of World War II, botanists became physicists, and other such changes were fairly common.[4] While the worker who has invested time and money in a Ph.D. shifts less frequently than others, the Bureau of Labor Statistics found that only 90 per cent of college graduates employed in chemical engineering had majored in that specialty. Among active mining and metalurgical engineers only 64 per cent were college trained for that job, and 36 per cent had received training in other fields. Specialists have frequently worked in several fields. Of chemists with Ph.D.'s 58 per cent had worked in two or more specific fields and 15 per cent had worked in three or more. For physicists, the figures are 57 and 8 per cent, and for biologists they were 54 and 14 per cent. Movement occurs in too great a quantity and in too many directions to support the belief that a high school adviser should select with the student, once and for all, the vocational goal.

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[4] Wolfle, *op. cit.*, p. 218.

Vocational counselors are aware that a very large percentage of both school students and the adult labor force are working at tasks under their potential. A careful examination of this problem has shown that 30.5 per cent of children in the ninth grade have intellectual capacity to do college sophomore work. Another 34.4 per cent could work above the ninth grade level.[5] In all, two-thirds are placed below their intellectual level. The seriousness of this condition is reduced with increasing age to the point that only one-fifth of those who are eighteen and older are underplaced in school.

Clearly, there are many factors which make it impossible for children to live up to their intellectual level and there are many reasons why they cannot be placed in a school grade according to intelligence. In general, the placement becomes more appropriate as students grow older but the counselor is always plagued by the fact that age promotion moves children along chronologically with the result that grade placement and even performance in that grade provide but a limited criterion of their possible performance.

School conditions are similar to those in the occupations. Among adults, 66.6 per cent were in jobs which require ability under the potential of the employee. Most misplaced were persons who had seven to twelve years of education and particularly those who had only one year of high school. In this latter group 80.1 per cent were underchallenged, though only 23.3 per cent of college graduates were so misplaced. Some of this differential occurred in industry because the American employer put a premium on a college degree whether or not the degree was essential to the occupation. This is not unlike chronological school promotion. In both cases the criterion for placement is a non-debatable, clearly indicated criterion rather than a measure of aptitude or ability. This underlevel placement makes it likely that counselors overestimate the level of ability needed in various occupations.

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[5] John B. Miner, *Intelligence in the United States, A survey—with Conclusions for Manpower Utilization in Education and Employment,* New York, Springer Publishing Co. Inc., 1957, pp. 108–131.

Motivation to go to college

Most gifted children should plan on college, since otherwise they are denied access to occupations which exercise their ability, providing for the greatest interest and the greatest human good.

In Stephen's family, college is the accepted state of affairs and in Pete's family, interest in academic matters will impel the parents to encourage his education beyond the high school. For Kathy and Nancy the college call is less imperious. Family traditions, social environment, remoteness from college, and sex all limit the pressures for college attendance. However, intellectual ability and academic interests provide internal sources of motivation. In this, they are like other gifted children who are found to be at least twice as interested in colleges as are children of average ability.[6]

Perhaps not every gifted child needs to go to college, though the majority do, and the hazards of not going are comparatively great. The gifted adult without a college degree is like a mountain-climber who goes out for a day and selects a comparatively small mountain. Though he climbs it easily and finds himself at the top of the hill early in the day, it is too late to go down and begin another climb which would provide more adequate challenge. So, too, the selection of a vocation may be moved by short-range objectives incompatible with the long-run needs of the individual and society. This problem is greatest for responsible children from families of limited means where brevity of training and immediacy of reward make a position temporarily attractive.

From the Terman data and from a Cutts and Moseley study of 347 gifted boys between the ages of seven and seventeen we may assume that gifted youngsters generally choose to enter professions.[7] For the most part, college is a prerequisite though there is great inconsistency in the matter. A statewide study in Ohio shows that industries producing dairy products required a degree to become a salesman but not to work in personnel. On the other hand, in the motor vehicle industry a degree was required in personnel but not in sales.[8] These requirements are often capricious and are certainly more complex than those of twenty years ago.

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[6] Herold C. Hunt, "Selection for the Professions," *Selection and Guidance of Gifted Students for National Survival* (Arthur E. Traxler, Ed.), Washington, D.C., American Council on Education, 1956, p. 39.

[7] Norma E. Cutts and Nicholas Moseley, *Bright Children, A Guide for Parents*, New York, G. P. Putnam's Sons, 1953, pp. 191–192.

The nature of the degree itself has also changed, with fewer being received in the humanities. Men frequently take degrees in applied sciences, in social sciences, and in business administration. Women take degrees in engineering, social sciences, business administration, and miscellaneous fields.[9] Some of the new degrees are adaptations to specialized vocations and the counselor must be able to help the student select the proper one. Employers not only overvalue the degree but they also overestimate the precision of the training. When a specific degree becomes a standard for employment it becomes a motivator for interested students.

In American culture the purpose in going to college tends to be vocational with an emphasis on grades and degrees rather than on the development of scholarship and knowledge. In a group of able students, 40 per cent of the boys and 30 per cent of the girls listed as the most important reason for going to college the fact that a degree was necessary in the work which they intended. Another 11 per cent gave as the most important reason the added financial and business rewards accruing from the degree. Only 5 per cent of the gifted boys and 9 per cent of the girls said that the major reason for continuing study was that they enjoyed studying.

The strength of this vocationalism or business interest is further emphasized by the willingness of students to change fields. When gifted students were asked whether or not they would shift majors if given a scholarship large enough to make their attendance at college secure, one-half of the high-scoring group said they would shift from the arts or education to engineering. Only one-fifth of those planning to study physical sciences or engineering would shift to a major in the social sciences.

These vocational ends cannot be extricated from other factors which help to determine whether or not a gifted student goes to college. This depends in part on mental ability and on the values of the society and the family. Value systems or thought patterns greatly influence the desire for education and the attractiveness of a specific vocation. In older societies the child is encouraged to live in the same house and pursue the same occupation as his father; but the American youngster is urged to outgrow or surpass his parent. He is encouraged to strike out on his own, to break away from his family, not to depend on paternal inheritance, to establish his own life, to have a better home than his father, to own a bigger car, and to attain a more influential position in the world.[10] Obviously economic, social, and philosophic motivations are closely intertwined and hard to determine.

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[8] R. Clyde White, *These Will Go To College*, Cleveland, The Press of Western Reserve University, 1952, pp. 89–105.

[9] Ernest Havemann and Patricia Slater West, *They Went to College*, New York, Harcourt, Brace and Co., 1952, pp. 20–21.

There are several surveys which help determine which factors are related to college entrance and to college success. Prominent among these factors is social class which is in itself a complex rather than a single factor. It involves educational level, economic conditions, cultural values, religious affiliations, locality, political values, and race.

The "upper middle class" is overrepresented in college. In 1954, the College Entrance Examination Board found that among the ablest 30 per cent of students there were college plans for 85 per cent of the boys whose fathers were in the medical profession, for 65 per cent of those whose fathers were in scientific professions, for 38 per cent of the sons of farmers, and for 25 per cent of the sons of semiskilled workers and laborers.[11]

About one-quarter of superior students whose fathers failed to finish grade school plan on college while 70 per cent of those whose fathers had obtained a degree plan to continue their own education.[12] Undoubtedly, part of this interest is related to the fact that college-educated parents encourage their children to understand and anticipate advanced education. Cole found that 58 per cent of gifted students who discussed the subject "a lot" with their parents planned to enroll while a large proportion of those who had not talked with their parents had little interest and no plans for college.

The degree of college interest is more closely related to occupational level and education of the father than to family income. The reasons for lack of interest seem to be diverse. The son of the white collar or skilled worker may not go to college primarily for economic reasons while the son of the farmer or semiskilled worker is more influenced by cultural than by economic deprivations.[13] Children from these occupational groups are unprepared for college in both attitudes and educational experience. They value active rather than intellectual ability and they feel inferior in intellectual tasks. Many of them reject identification with the intellectual worker as they have heard him described. They have limited experience with academic ideas or advanced learning skills so they are genuinely handicapped in bringing native intelligence to bear on college assignments.

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[10] Martha Wolfenstein, "Movie Analyses in the Study of Culture," *Studies in Motivation,* (David C. McClelland, Ed.), New York, Appleton-Century-Crofts, Inc., 1955, p. 308.

[11] Hunt, *op. cit.,* p. 39.

[12] Cole, *op. cit.,* pp. 17–20.

Schoolmen and others have sought to liberate talent wherever it is found without regard for social or occupational privilege. The problem continues to be a difficult one. From the 1956 *Report* of the National Merit Scholarship Corporation, a college professor compiled some revealing figures.[14] He developed an "Index of Productivity of National Merit Scholars by Occupational Class." His compilations show that one recognized scholar would be produced from 12,672 professional, technical, and kindred workers but it would take 3,581,370 or almost thirty times as many laborers (except farm and mine) to supply one scholar. The index changes from group to group on the U.S. Census classification. In descending order these groups are professional, managerial, sales, clerical, crafts, operatives, service workers, farmers, laborers. The children of professional fathers have seven chances to one when compared with children of men in general, eleven chances to one when compared with children of craftsmen, and sixty chances to one when compared with the children of farmers. The investigator computed a ratio for the children of librarians compared with the children of laborers. That ratio reaches the startling level of 1,120 to 1. Differences of this magnitude are not explained in terms of natural intelligence alone. The children of laborers and farmers and to a lesser degree the children of service workers and operatives have not developed their full academic potentials. They are short in verbal and mathematical competence probably because these are less a stock-in-trade with their parents. Disinterest and inadequate experience combine to make the children academically underprivileged. It is an immense task to free these pools of native ability and open the opportunities for an advanced education.

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[13] Miriam L. Goldberg, "Motivation of the Gifted," *Education for the Gifted* (Nelson B. Henry, Ed.), *57th Yearbook NSSE, Part II*, Chicago, University of Chicago Press, 1958, pp. 94–95.

[14] Horace Mann Bond, "The Productivity of National Merit Scholars by Occupational Class," *School and Society*, 85, No. 2216, September 28, 1957, pp. 267–268.

Family influences cannot be described simply in terms of class and economics for the family remains the most powerful agency in promoting value patterns in the child. From the home come the strong aspirations and the attitudes of self-reliance, competitiveness, and self-confidence which have been found predictive of college attendance. Academic and business achievement motives are most common in families in which mothers have high expectations for their children, setting demands and restrictions of an academic kind and requiring the children to operate independently at an early age.[15] These motives are related to severity of upbringing and are less commonly found in indulgent families which spare children from the suffering which goes with independence. These family conditions are closely related to social class since child-rearing practices differ from cultural level to cultural level. The expectations for independence and success are also associated with economic and class standards, since they are part of a struggle for prestige or part of a struggle to avoid a neurotic sense of guilt or failure.

It must be concluded that the upper middle class are motivated toward higher education because they view it as a means of upward mobility. This motivation is less dominant in the lower classes because academic capacities are less adequately developed, college is not a topic of conversation, and college does not assure the same upward mobility. Race, religion, or social group interfere with business success, and children from lower class homes do not have equal possibilities of securing the rewards which are ordinarily associated with a college degree.

As might be expected a strong achievement need in American culture has been associated with high-level interests on the business categories of the Strong Vocational Interest Test.[16] This business interest probably arises from cultural values since outstanding achievement in business has been more admired and accepted than achievement in intellectual pursuits. Perhaps there have been recent shifts in these values. The prestige-ranking of the research scientist has risen and the role of mathematician is more attractive. Able students may be expected to discover which are rewarding occupations and then to work for recognition in them.

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[15] J. C. Flugel, "Characteristics of the Super-Ego," *Studies in Motivation* (David C. McClelland, Ed.), New York, Appleton-Century-Crofts, Inc., 1955, p. 275.

[16] Goldberg, *op. cit.*, p. 92.

College increases the earning power and the social recognition for each student, but these increases are unequal. Students with similar intelligence and equally good school records who differ in racial and religious characteristics achieve differently. It is possible that some environmental conditions are not motivating, that certain value systems do not encourage competitiveness, and that some environments lead to docility. It is clear that ethnic, religious, and racial differences influence the enthusiasm for college and affect the vocational success that follows. The student who attends a prestige college and does not work to pay his way enjoys larger adult income than his fellow. His selection of a college may be a mark of his competitiveness and the support which he receives may be a mark of familial willingness to promote the child's success.

Ethnic and social motivations have been most notable in the case of gifted Jewish children. First of all, a large incidence of giftedness has been found among them and some authors explain this frequency as an achievement-related phenomenon. It is generally argued that Jewish families respect and encourage learning, stimulate a drive for success, especially in professional careers, and surround their children with environmental advantages which are not available to lower socioeconomic groups.

There is a great deal of fascinating literature in this field. Most of it indicates the centrality of the family in motivating the child to go to college. The Jewish or Unitarian family with a college tradition, in a college town, and engaged in business tends to discipline the child and set expectations which produce self-confidence and competitiveness. These factors impel the child toward higher education; he is given a further impetus if he attends a racially unsegregated school which provides occupational information and arranges considerable contact with school counselors.

Negative predictors for college attendance are characteristic of the Negro girl who lives in a rural environment with parents who have not been to college and who work in unskilled occupations. If the family is friendly and economically insecure and if the parents feel unable to deal with a gifted child the likelihood of college attendance is further decreased. Some of the related factors are summarized in Figure 9.

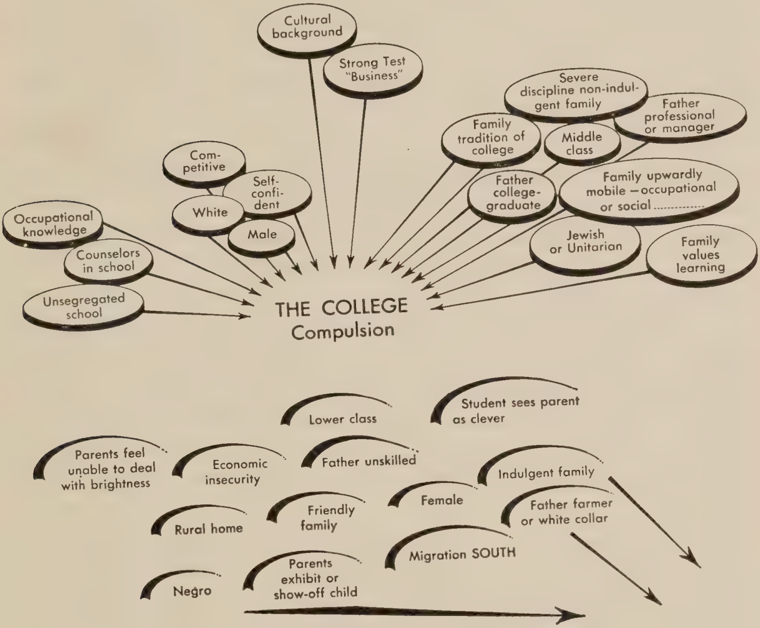

Figure 9.

Factors Which Influence the Probability of College Attendance

One idea should be restated. The children who talk about college with their parents or with school counselors much more commonly enter college. Among the able third, those who talked a "good deal" with teachers or guidance counselors intend to continue their education in the ratio of ten to three when compared with those who have talked little. Some of the students may have talked to school personnel because they have already determined a plan but this does not alter the desirability of having trained counselors available. In the Cole study of able students, only 25 per cent report having "quite a lot" of discussion with teachers or counselors. The opportunity to talk with counselors was limited since only 46 per cent of the schools had professional guidance workers.[17]

Several of these influences are evident in a recent study of 34,151 Wisconsin high school seniors.[18] Those in the top 30 per cent most commonly planned on college. Nevertheless, in the top 15 per cent, 23 per cent of boys and 47 per cent of girls had no college plans. In most cases the planning was very significant since 81 per cent of the graduates followed the plans which they had stated the previous spring.

Planning was closely related to the parental occupation and the level of parental education. This factor made less difference among gifted students but for the whole group 66 per cent of the children of professional workers and only 18 per cent of the children of farmers planned on college. For those planning on college 70 per cent of the parents were college graduates compared with less than 50 per cent for the non-college bound. If neither parent had attended college about 20 per cent of the children planned on doing so. If one parent had attended the percentage rose to 50 and if both parents had attended it rose to 75. Those who planned on college had positive encouragement from their parents, with only 5 per cent reporting parental indifference compared with 88 per cent of those who were not going.

Seventy-five per cent of the college-bound students reported that their friends were also going and 71 per cent of those going to jobs reported that their friends were also getting jobs. Gifted boys who did not plan on advanced education were eager to start earning money and expressed approval of practical or on-the-job training. They were unwilling to borrow money and repay it after graduation. In many cases they would not attend if they had the money.

The typical gifted boy with no plans for college as found in the Wisconsin study was the son of a farmer or semiskilled worker who had never attended college. The family was of average or below average income and the student believed that they could not afford to send him to school. The student attended a small school and was less than averagely interested in his studies. Though his high school record had been good his teachers did not identify him as one who had shown unusual achievement or promise.

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[17] Cole, *op. cit.*, pp. 17–20.

[18] J. Kenneth Little, "The Wisconsin Study of High School Graduates," *The Educational Record*, 40, No. 2, April 1959, pp. 123–128.

Suitable vocations

Choosing a vocation has become increasingly complex. It is particularly complex for gifted students whose capacities make it possible for them to fill almost any position. The school must play a vital role in helping the child select a field of work. It should arrange for career days, occupations courses, and access to readings on occupations. It should arrange for suitable testing programs with emphasis on the tests and counseling which assist the student toward a clear understanding of his abilities and personal needs. These services become more significant as there is an increase in the proportionate number of occupations which require intellectual competence with advanced education.

The National Defense Education Act stresses the need for professional assistance in making vocational choices. Certainly this matter is one of great social consequence. Dael Wolfle pointed out that the country had a poor record in that it provided a college education for only half of the most promising 7 per cent of the nation's youth, as well as in that it did not utilize non-college graduates in technical jobs in which they could function effectively.[19] Some waste may be avoided if guidance personnel become more sophisticated. This sophistication is much more than knowing about jobs. It must involve understanding of personalities, a knowledge of value systems, and an ability to help the student relate his self-image and his knowledge about occupations in an intelligent choice.

The counselor must also be sophisticated in occupational information. A continuous supply of information appears essential. Since national manpower needs now play a major part in the occupations picture the responsibility for this information service might properly fall to the Federal Office of Education. The data must include both a national and a zone picture. It should include summaries of current demand and supply, predictions of demand, qualifications for various occupations, and changes in these qualifications with descriptions of training opportunities.

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[19] Wolfle, *op. cit.*, pp. 136–184.

Counselors need to be well acquainted with the levels of ability for people who now serve in various fields. Many highly prepared workers are working below their ability level. Because fewer modern occupations depend on physical strength there is greater need for the full development of intellectual capacities at all levels. Uninformed advice may dissuade young people from acquiring the education which would allow them to function effectively in technical or semiprofessional jobs. There is some evidence that counselors overestimate the native ability and the high school scholarship which are prerequisite to proceed to technical licensures, undergraduate degrees, and even graduate degrees in the various fields. In many cases the intelligence necessary for training is above that essential to the position. There is no blanket IQ critical for all technical occupations, for all college graduates regardless of the field, or for all graduate students. Currently physical science majors include a very large number in the higher levels of intelligence though some in the lowest quintile of ability are successful. Large numbers of chemistry and physical science majors have high ability with 35 per cent or more in the top quintile of ability.[20] This is well above some other scientific majors. Undoubtedly, the selective factors include beliefs about the subjects as well as the effects of traditional selection and training programs. These data are not a static truth nor can they be interpreted to mean that this distribution of intelligence is essential.

Generalizations must be very cautiously drawn. This may be illustrated in the field of psychology. College graduates in this field are rather widely distributed over the scale of ability. Their academic ability levels are roughly comparable to students in the earth sciences or more nearly comparable to the abilities of those in the humanities and arts. Psychology undergraduates do not have as large a proportion in the upper quintile as either chemistry or physics. However, graduate students in psychology show an amazingly different distribution. In the graduate group a very small proportion are among the less able and a very large proportion, nearing half, are in the highest quintile of ability. While the distribution of ability for those interested in physical science varies comparatively little from high school to college or from college to graduate school, the case for psychology is entirely different. An undergraduate degree in psychology is considered as a general or cultural degree and does not carry professional status. At the graduate level, psychology becomes one of the most competitive of all fields and includes a very large proportion of students with high ability.

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[20] *Ibid.*, pp. 191–196.

The capable vocational adviser must be well informed and must constantly study manpower needs and occupational changes.

Which college?

When college has been established as a goal the student must seek help in finding a college appropriate to him. The decision is a complex one which involves finances, distance from home, specialty to be pursued, satisfaction of social interests, and opportunities for personal development.

Vehement recommendations are common. Many of them are little more than a vote of confidence for an alma mater or for schools like the alma mater. In a survey of college graduates it was found that from 72 to 98 per cent recommended the college which they had attended.[21] If the adult does not recommend his own college he may support the private institution as "best" for the gifted student. No simple conclusion can be drawn on the question of public versus private. The graduates of a particular college may include successful scientists or businessmen but this does not in itself prove the superiority of the instructional program. The record of success for graduates may indicate that the selective process is good, assuring that the college secures students with excellent natural capacity or it may prove that the placement service is superior. In most cases it should be hoped that colleges which attract able students then make special adaptations to them. At least the student choosing such a college may anticipate working with stimulating colleagues.

In some cases the large public university may provide the best opportunities available. While such universities admit some students of limited ability they also enroll students of outstanding capacity. In some cases these students congregate in certain departments or subject-matter areas and the able student may find himself in a group which is every bit as able and stimulating as the small private college with a reputation for intellectualism. The large university has laboratories, libraries, and other facilities of surpassing quality and recent studies indicate that many of the most distinguished faculties are those in the large public universities.[22] On the other hand, the large institutions frequently fail to make the good facilities and the inspirational faculty available to undergraduates.

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[21] Havemann and West, *loc. cit.*

The significant point is that simple rules-of-thumb are inadequate to assist the student in selecting a college. Useful rules cannot be drawn from single pieces of data. For example, the candidates from public schools made a better record on the 1953 College Entrance Board Examinations than did private school students. This scarcely proves that there is a superior instructional program in the public schools. The difference may be more closely related to motivational factors which cause some students to take the test and others not to take it. In 1954, Harvard enrolled equal numbers from public schools and private schools. A much larger percentage of public school graduates were invited to join Phi Beta Kappa. While this is some evidence of competent instruction in public schools, an adequate interpretation would involve an examination of the possibility that only very highly motivated students applied from the public schools. Such examples serve to illustrate the complexity of selecting a college.

The selection of a college is an individual problem. Suppose a high school graduate has a small sum of money available for advanced education. If he enters a scientific field he has a good chance to secure scholarships, fellowships or assistantships. He may be able to earn all of his expenses for graduate study. In such a case, he may choose to spend his funds for an undergraduate education in a private institution. Another student with identical funds but majoring in English literature may wisely choose a different course. Graduate stipends and other financial help are smaller and less commonly obtained in the latter field. The second student may choose a public undergraduate school in order to hoard his meagre funds for graduate study. In each instance the student and counselor must have information about the colleges and about the student. Choosing a college is a personal matter which involves a great deal of thought.

The school counselor can best serve to acquaint students with colleges and universities in the immediate area where the majority of students will attend. For other colleges and junior colleges in the

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[22] Eric A. Walker, "Quality in Quantity," *The Educational Record*, 40, No. 2, April 1959, pp. 129–136.

United States he must depend on published information which may be found in volumes such as *American Universities and Colleges* or its companion piece *The American Junior College*.[23] While some of the three million or more students will be misplaced, the skilled adviser may help the student reach a reasonable conclusion.

The counselor can also help bridge the gap between high school and college so that the student knows what to expect and is prepared to meet the demands. Colleges arrange for visiting days and high school students are encouraged to sit in on classes, visit libraries and get a perspective of the college which they intend to enter. In the state of Washington, colleges unite to provide a special program of articulation. As a group, representatives of several colleges visit high schools. In group sessions and in individual conferences they help the student find the various possibilities which are open to him. This program is directed toward guidance more than toward recruiting. These schools also assist in articulation through talking with school counselors, publishing brochures, answering letters, and arranging for special high school visitations.

Some colleges have attempted to provide for articulation through the alumni. Clubs and individuals have provided opportunities for high school students to discuss the particular college and its program. While these efforts are useful, the greatest help comes from counselors and teachers. They best understand the student and the problems which are to be faced, and their professional relationship assures more responsible and independent counseling.

Financial aid

Scholarship and fellowship programs have become instruments of national policy and they are big business. Nevertheless, surprisingly few gifted students are informed about the sources of financial aid. Cole found that only 22 per cent of able students knew of more than three out of seven common sources of help. Eight per cent had never heard of any.[24] Students in college-going communities where economic conditions were good knew more about financial aid and were more interested in going to college. In factory communities there was less knowledge and less college interest.

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[23] Mary Irwin (Ed.), *American Universities and Colleges*, 7th Edition, Washington, D.C., American Council on Education, 1956, and Jesse P. Bogue (Ed.), *American Junior Colleges*, 4th Edition, Washington, D.C., American Council on Education, 1956.

[24] Cole, *op. cit.*, pp. 17–20.

The magnitude of financial need is indicated by the fact that between sixty thousand and one hundred thousand highly able students did not proceed from high school to college in 1955.[25] These are figures from a period of college growth and economic expansion. At the same time it was found that the direct outlay for a college education averaged seven thousand dollars. In some cases the costs were below four thousand dollars; in others, above ten thousand dollars. When this average figure was adjusted for subsistence and the difference between possible earnings and actual earnings, the average cost climbed to nine thousand dollars.[26] Though the survey shows that lifetime earnings were increased more than the amount which would accrue from a nine-thousand-dollar investment, students are sometimes unable and sometimes unwilling to invest this amount.

Application for scholarship help does not have a one-to-one relation with economic need. For example, in 1956 the College Scholarship Service received twenty-one thousand applications for financial aid. Among those who were refused 90 per cent went to college anyhow. Of these, 62 per cent received aid from some other source.[27] Undoubtedly many did not go to the college of their choice and others worked part time or drew very heavily from family funds. Further evidence of the widespread tendency to apply for help regardless of economic conditions is contained in the fact that 22 per cent of the applications came from professional homes, though only 9 per cent of high school seniors in the top 30 per cent of ability were from the same homes. On the other hand, only 9 per cent of the applications came from homes in which the father worked in clerical, retail or nonsupervisory occupations, though 23 per cent of seniors in the top 30 per cent of ability were in this social and economic class.

Some years ago, college applications were made in person and decisions to award a scholarship were made by an individual faculty member. Colleges now use special tests, special testing services, special data-gathering services and special boards to administer financial aid programs. Perhaps one of the major changes has been the development of organizations such as the College Scholarship Service to assist in the selective process. This agency was developed to service more complex scholarship plans.

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[25] Charles C. Cole, Jr., "Current Loss of Talent from High School to College: Summary of a Report," *Higher Education*, Washington, D.C., U.S. Department of Health, Education and Welfare, Vol. XII, No. 3, November 1955, pp. 35–38.

[26] Paul C. Glick and Herman P. Miller, "Educational Level and Potential Income," *College Board Review*, Winter, 1957, No. 31.

[27] Cole, "Scholarship Applicants Today," *op. cit.*, pp. 17–20.

In a recent year, the College Scholarship Service handled more than twenty thousand individual forms for more than 120 colleges involving more than 40 per cent of all the institutional scholarship funds in the country.[28] Agencies have grown up as school policy has turned from assuring enrolment to providing for students of high ability. Most of the newer scholarships are assigned on ability with the amount determined by need. The funds involved have become very large. In 1955 alone, business and industry gave seventeen million dollars to the support of education.[29] One of the better-known large funds was established in 1955 by the Sears Roebuck Foundation, *Time*, and the Ford Foundation, joined by other organizations to set up a scholarship fund totaling more than a million dollars a year.

The National Defense Education Act of 1958 with its magnitude of provisions and the dynamic which comes from a national policy may produce large and prolonged changes in American education.[30] The Federal portion of loans to students in higher education has been authorized at levels from seventy-five million dollars to ninety million dollars per year. The act provides for graduate fellowships which will near four million dollars annually. It provides fifteen million dollars toward improvement of guidance services and more than six million dollars toward the improvement of guidance personnel. It further authorizes an expenditure of seventy million dollars toward strengthening instruction in science, mathematics, and foreign languages, with a further eight million dollars in a separate title for foreign languages. These authorizations are supported by further funds for research, vocational education, a science information service, and the improvement of statistical services in state educational agencies. An act of this kind will profoundly affect higher education, opening it to many able students and greatly influencing the offerings available.

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[28] Frank H. Bowles, "College Scholarship Service," *Selection and Guidance of Gifted Students for National Survival* (Arthur E. Traxler, Ed.), Washington, D.C., American Council on Education, 1956, p. 68.

[29] Malcolm S. MacLean and Robert B. Carlson, "College and University Programs for the Gifted," *Education for the Gifted* (Nelson B. Henry, Ed.), *57th Yearbook NSSE, Part II*, Chicago, University of Chicago Press, 1958, p. 316.

[30] Committee on Labor and Public Welfare, *The National Defense Education Act of 1958*, Washington, D.C., United States Government Printing Office, 1958.

Scholarships and admissions policies have been important issues in the last few years. As the college population climbed to over three million it was rumored that not more than 20 per cent of old college graduates would be accepted if they now applied to their alma maters. Several articles have pointed out that a larger supply of students makes it possible for colleges to be more selective and more willing to refuse admittance to the son of an alumnus. This kind of thinking has produced anxiety and the subsequent problems of multiple applications.

Multiple applications produce "ghosts"—that is, students who are accepted and then do not enroll. The number of "ghosts" indicates that in some cases admission problems have been overemphasized. One college received eighteen thousand inquiries but only 5,600 applications. Of these applications only 3,400 were completed; the school admitted eighteen hundred, of whom nine hundred arrived.[31] Since the school wanted an entering class of one thousand there were one hundred vacant places. This of course is a striking exception.

At the present time the most serious loss of talent occurs at the point of high school graduation. More adequate curricula, more scholarships, and effective counseling should increase the reservoir of able and specialized workers by more than half. While the colleges will be overfilled in the next decade the gifted student need not be frantic. He will probably be able to enter the college of his choice or failing that, certainly the college of his second choice. If necessary, he can seek financial help or earn part of his expenses. He probably should and can go to college. It is the high school's business to see that he is properly informed.

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[31] T. Leslie MacMitchell, "You Can Get Into College," *College Board Review*, Fall, 1957, No. 33, pp. 24–27.

16

Emotional and Character Development

There persists a belief that brilliance and genius are marred by insanity and unhappiness. Terman was moved to show, once and for all, that strong and intelligent persons did not suffer from compensating inferiorities or pathological deficiencies. In follow-up studies his subjects were not puny, were not overspecialized in their interests, were not emotionally unstable, socially unadaptable, morally undependable, or psychotic, and did not deteriorate into mediocrity in adulthood.[1] Data gathered before 1950 indicated that they suffered fewer breakdowns, were less often hospitalized, had lower suicide rates, had better marriage records, and demonstrated wider interests than the populace at large. Those who did become maladjusted or mentally ill showed a higher recovery rate.

While it is comparatively easy to calibrate the success of gifted persons in terms of academic achievement or financial success, it is exceedingly difficult to estimate their achievement in terms of personal satisfaction or adjustment. Allowing for inadequacies of measurement and for the lack of reliable judgment, Terman appears to have demonstrated that superior children of both sexes and all ages surpass normal children in desirable character and personality traits. Parents and teachers agreed that gifted subjects in the Stanford studies participated more widely in social activity and excelled in all traits other than mechanical. Ninety per cent of the gifted exceeded control children in intellectual interest and 84 per cent were higher in social interests.[2] When these large areas of development were treated in terms of individual traits, 60 to 80 per cent of the experimental group exceeded the mean expectations. It was concluded that the gifted child of nine years had reached a level of character development corresponding to the average for fourteen-year-olds. Of course, gifted children achieved particularly high ratings on intellectual characteristics such as prudence or forethought, common sense, and curiosity but they were also superior in characteristics such as sense of humor, truthfulness, conscientiousness, and leadership.

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[1] Lewis M. Terman *et al.*, *The Promise of Youth, Follow-up Studies of a Thousand Gifted Children, Genetic Studies of Genius,* Vol. III, Stanford, California, Stanford University Press, 1930.

The California group maintained the relatively desirable adjustment patterns of childhood into and through adolescence. They were socially approved and frequently sought as companions. The behavior of girls was particularly acceptable and was marked by perseverance and desire to excel. Both sexes have a record of good home and school citizenship. Discipline for 87 per cent of the boys and for 90 per cent of the girls was good. Behavior problems occurred in only 5 per cent of boys and in 2 per cent of girls, which is about half as commonly as the normal occurrence.[3]

The positive qualities continued in adult records. In early studies, incidence of insanity and hospital commitments was slightly below expectancy and projections for the gifted group were below the 5 or 6 per cent reached in the total community.[4] More recent data are less reassuring that these qualities persist through and beyond middle age. The rate of hospital admissions for men continues just below average but for women it is slightly above average. The majority of admissions are voluntary and made to private institutions. The admission statistics may be an artifact of status because superior intellectual ability prompts the gifted to seek help before serious impairment and this group enjoys economic success which makes it possible for them to seek help. It cannot be concluded that equally serious emotional problems are more common among gifted than among average women.

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[2] Lewis M. Terman *et al., Mental and Physical Traits of a Thousand Gifted Children, Genetic Studies of Genius,* Vol. I, Stanford, California, Stanford University Press, 1925, pp. 455–555.

[3] Terman *et al., The Promise of Youth, op. cit.,* pp. 182–189.

[4] See Lewis M. Terman *et al., Genetic Studies of Genius,* Stanford, California, Stanford University Press. *The Gifted Child Grows Up, Twenty-Five Years' Follow-Up of a Superior Group,* Vol. IV, 1947, p. 123, and *The Gifted Group at Mid-Life, Thirty-Five Years' Follow-Up of the Superior Child,* Vol. V, 1959, pp. 28–51.

With the exception of delinquency the gifted women seem to have proportionately more adjustment problems than gifted men when the comparison is based on female/male ratios of expectancy for average people. The raw number of commitments is larger among gifted women. Suicide and alcoholism rates for gifted women are nearer the average rates for women than are the same rates for gifted men compared with average men. In the female group, the greater number of adjustment defects are among the "brighter brights" and those who discontinued school early. Conclusions must be limited by the small numbers and the incomplete life records but among the gifted it appears that women more nearly reach the expected rate of adjustment problems than men.

The earlier studies indicate that as a group the more successful and brightest men were probably most adequately adjusted. The top group was particularly high on personal integration toward goals, on perseverance, on self-confidence, and on the absence of inferiority feelings. *A* subjects had higher marriage rates, lower divorce rates, and their wives reported higher levels of family happiness.[5] This superior level of social development was noted by field workers who rated the *A* group superior to other gifted people on appearance, attractiveness, poise, speech, alertness, friendliness, talkativeness, attentiveness, curiosity, and originality. Though the opinion of field workers was probably influenced by minor halo effects, it appears that the more effective men were, the better was their social and emotional adjustment. The most recent survey shows no appreciable differences in adjustment related to the intelligence dimension.

The problems of extraordinary intellectual capacity

Many writers assume that beyond a certain level, problems of adjustment become increasingly difficult with increasing levels of intelligence. Terman found the "tops" well adjusted but believed they had to overcome greater difficulties and he wrote, "Extreme precocity unavoidably complicates the problem of social adjustment."[6] He attributed these complications, in large part, to the fact that advanced children select older companions at least three or four times as frequently as do average children.[7] Hollingworth, who worked carefully with the truly remarkable child, was likewise convinced that extreme divergence in ability made it difficult to establish satisfactory play and social relationships with other children.

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[5] Lewis M. Terman *et al.*, *The Gifted Child Grows Up*, *op. cit.*, pp. 338–340.

[6] Terman *et al.*, *The Promise of Youth*, *op. cit.*, p. 481.

It is probable that both ability to organize and skill in performance place gifted children in dominating and sometimes disapproved roles. Even among adults, unusually able behavior may induce resistance through fear of being manipulated. If no animosity develops, it remains difficult for very unusual children to find companions who share their interests. They may turn to solitary activities which are dominated by reading or by dramatic and imaginative play. These are frequently viewed as inadequate adjustments.

Hollingworth was convinced that there is a range of optimum intelligence suited to the easiest development of a well-rounded personality in the world as it exists. She placed this optimum range somewhere between 125 and 155 IQ.[8] Hollingworth believed that the one child in ten thousand or more who may test as high as 180 IQ has unique value for society, but may be misunderstood and may find it difficult to form congenial associations. He is more likely to suffer from loneliness and personal isolation than the child of somewhat lesser ability. With less giftedness, persons are intelligent enough to win the confidence of large numbers of their fellows, to be chosen as leaders, to direct effectively their own lives, and to achieve esteem and security.

Hollingworth considered the social and leadership problems essentially problems of immaturity, for adjustment becomes easier with each year of growth. In her opinion, the danger years were between four and nine. The relative difference between sixteen years and nineteen years is much less than that between six years and nine. The decreased importance of age difference with greater maturity makes the older gifted child more secure and comfortable.

The social problem of the very remarkable case may readily be overemphasized. A few dramatic cases of able persons who were unhappy have led some writers to suppose that intellectual ability creates unhappiness in the degree that the person is different from the average.[9] They assume that gifted children and adults see the rest of the world as lumpish, unpleasant, and disgusting. They picture such persons going through life in a state of enforced calm, faced with the meaninglessness of the ordinary goals and dreams of men. It is presumed that the gifted person is as unhappy with the average performance as the average person is unhappy with the performance of incompetent companions.

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[7] Terman *et al.*, *Mental and Physical Traits of a Thousand Gifted Children*, *op. cit.*, p. 431.

[8] Leta S. Hollingworth, *Children Above 180 I.Q.*, Yonkers-on-Hudson, World Book Company, 1942, pp. 264–265.

This is an overstatement of the case. Average persons may be embarrassed by social incompetence or by intellectual blunders on the part of dull persons. They are embarrassed because the person does not meet minimum accepted standards of the society. The relation of gifted persons with average persons is quite different since the average person does meet these expectations. Though the brilliant individual meets the standards easily, the social distance between brilliant and average cannot be judged in the same terms as the distance between average and moronic.

Hollingworth insisted that gifted persons must learn to "suffer fools gladly." It is eminently clear that very able persons need unusual patience but it seems most unwise to encourage a contentious or aggressive attitude which may arise if parents or teachers disillusion children about the value of those who do not reach the same intellectual level. The immature personality may well overreach reason in seeking the securities which come either from being identical or from being remarkably different. We may expect gifted children sometimes to seek the protective coloration of normalcy. Such children hide their intellectual differences in order to secure their standing as one of the group. Other gifted children seek status through insisting on recognition of their superiority. They seek security by assuring themselves and their neighbors that they accomplish things easily and have no regard for the opinion of the group. Immature children will attempt to solve their social problems by timid "going-with-the-crowd" or hostile non-conformism but it is unwise for teachers to allow—never mind encourage—the development of either maladjustment.

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[9] Max Rafferty, "Esau's Children," *C.T.A. Journal*, 53, No. 2, February 1957, pp. 18–21.

The Creative Approach to Maturity

Nancy was writing a play to be produced at school. She had been much impressed by the story of Pocahontas and she wanted to tell of the bravery and kindness which the Indian princess showed to the settlers. "You can't show that everything she did was kind and brave," Nancy said.

"Well, what are some of the kind and brave things that she did?" encouraged her mother.

"One of them," Nancy replied, "was when the Indians were going to kill Captain John Smith. First Pocahontas begged her father not to do it. He was a great chief and very powerful. Nobody else would have dared to ask him to change an order! Pocahontas was afraid, too—but she tried to save him. Powhatan wouldn't even change his mind for Pocahontas. Maybe he wanted to, for his daughter—but I suppose he was afraid that the other Indians would think his orders were no good. Maybe they'd even make him not be chief. Anyway, they got ready and they put John Smith's head on a stone and—just before they killed him, Pocahontas ran over and put her head over Captain John Smith's, and she claimed him as a brother."

"What difference did that make?"

"Oh, they wouldn't kill anyone in the tribe."

"Why did they let Pocahontas make him her brother?"

"They couldn't stop her because there was an Indian law which allowed a person to claim prisoners as brothers. Then the prisoner was adopted into the tribe. I'd better say something about that law in my play."

"How do you think the Indians felt when she did that?" asked Nancy's mother.

"I guess they felt good," Nancy mused. "They liked John Smith because he was brave and they loved Pocahontas. They must have thought she was very brave, too, when she put her head down under their tomahawks. It's funny that she wanted to save him when all of the other Indians wanted to kill him. It must be hard to go against all of your own people. I don't even like to do things when Kathy disagrees. It would be awful hard to do it with all your family and all your friends against you."

"How are you going to tell your audience about that?" inquired her mother.

"I really can't because you can't really write about feelings," Nancy answered. "Maybe I could have a place where she's sitting by herself and talking out loud about things. That better be at night because you sometimes think about things like that at night."

"What would she say?"

"I think she would say that John Smith was a good man—and that maybe, he was like her own people and that it was wrong to kill him."

"Did Pocahontas want to save all of the settlers?"

"Yes. One time she came through the rain and the darkness to warn them that her people were bringing food but it was just a disguise. When the settlers were eating, the braves would kill them. She seemed to want to save everyone."

"I suppose she liked them."

"Oh, yes! But she was sad when she left her own people and she must have felt strange when she got married and went home with Mr. Rolfe. But she liked the people there and they liked her."

"I suppose the play could say something about all the new things she must have learned there," said Nancy's mother.

Nancy liked that idea and she said, "Pocahontas learned very fast. It really wasn't very hard because she already knew a lot of it. In England they had spoons for stew and knives for cutting, but they used their fingers to pick up food and that was just like the Indians. Then at the big parties in England, there were finger bowls and a cloth. They ate for a while and then they washed their hands. The Indians used bowls of water too, except instead of cloth they used turkey feathers for drying their fingers."

"Who," asked Mother, "will play Pocahontas?"

"Oh, I don't know," said Nancy, "the teacher will pick out somebody. The girl will have to pretend that she is slim and dark and beautiful—and I think Pocahontas had a soft voice."

"Do you suppose she looked like the magazine pictures of pretty girls?"

"No, she was dressed in skins and she had no lipstick. I think her skin was very dark—maybe real brown but kind of soft. Sometimes they painted themselves but I don't think Pocahontas did because she was too beautiful and young. I think her eyes would be real bright and dark."

"What else?"

"I think she smiled a lot because she really wasn't afraid and she liked people and . . . animals and being outside."

"How would she behave differently from the girls in stories now?"

"I think she would seem younger and quieter."

Nancy's discussion demonstrates sensitivity to feelings, understanding of other's beliefs and values, identification with the heroine, the ability to evaluate her own character in terms of the story, a search for an understanding of character and emotion, and an ability to use the guidance and emotional support of an adult.

Sensitivity and flexibility

Good mental health depends on a sound view of life. Broadly considered, anything which contributes to greater understanding contributes to mental health and personal development. More narrowly viewed, mental health is especially related to a sound view of the self and of interpersonal relationships. Naturally, intelligence functions in the development of a life view. High intelligence allows for complexity and for a range of choice which results in uniqueness or individuality.

Ability to understand intensifies the need to understand. Gifted children are forceful and active in their contacts. They develop a vigorous and acute perception of life and are likely to have strong feelings of personal identity or vivid life-styles. The same intelligence which causes them to search for answers in science drives them to understand other people and themselves. They seek affection and personal autonomy. In their search they may be thwarted by institutionalism and urbanized isolation, by the tyranny of group values and prejudice, by disorganization in the affection of their families, and by inconsistencies in the traditions and values which surround them.

Nancy is one of the vigorous personalities. She is energetic in developing many and harmonious relationships with other people and in increasing insight into herself. She is fortunate because her family encourages her adient or outgoing behavior. They value her ideas and encourage her to understand the standards which are set. They provide an atmosphere of emotional warmth with an opportunity to examine values and grow in independence.

Unfortunately, not all gifted children live under such auspicious conditions. Their development is curtailed by anxiety and fear. Intelligence alone does not solve their problems or reduce the effects of family stress. The greatest damage is done in the first few years. The fundamental reactions to fear may be learned in the first few months or even in the first few weeks and the affiliative or dependent reactions may be largely learned in the first six months. These primitive learnings are the base on which other learning is built. They are acquired before there is any highly developed intellectual control and it has been thoroughly demonstrated that instability and upset during this period may produce almost permanent personality maladjustments.

Intelligent children share the same social and affectionate needs which characterize other children. Regardless of ability, each person shares a subtle conviction of solidarity with mankind in his aspirations, sorrows, fears, and hopes. Each child needs the early warmth which not only guards against primitive maladjustments but opens the child to contact with his environment. Family affection is most fundamental but human relations are always vital centers of security. Gifted people seek congeniality. They press toward conformity and they develop anxieties from fear of rejection. When he was quite small, Pete sought to understand people's feelings toward him and also to understand their expectations. On one occasion he discussed with his mother the fact that he was getting to be a big boy and didn't cry much anymore. His mother remarked, "No, you cry very little. But it's perfectly all right to cry sometimes. There's nothing wrong with crying, you know."

Pete rejoined, "Then why does everyone always say 'Don't cry, don't cry?' "

It must not be assumed that high intelligence limits fear. It may increase the awareness of danger. In the "open field" situations used to study fear among animals, the brighter ones develop the greater handicap. In this situation, animals are placed in a large, lighted area and the responses are usually fearful. More intelligent animals with sharper recognition seem to perceive greater danger in the surroundings. So, too, the vivid visualization and the acute memory which go with superior intelligence may bring danger very near. Stephen calls himself "a back-seat worrier." His ability to recognize road hazards is reinforced by his memory of accidents to produce behavior which is cautious and timid.

These mild anxieties give way to neurotic and psychotic responses when family conditions are extremely inadequate or totally intolerable. If this happens, the child loses natural flexibility and is unable to reexamine or rearrange his thinking. Consequently, normal emotional development ceases. The emotionally handicapped bright child becomes rigid and inflexible. The realities which he observes and the choices which are available to him are incompatible with his self-concept.

Such a child may fragment his life and exclude the most horrible parts. He may depersonalize and devalue himself, he may deal in self-condemnation and self-depreciation, or he may repress his sense of failure and guilt by becoming rigid, unresponsive, and socially detached. He may defend himself by inventing pathological perceptions in which he envisions the world as hostile, cruel and evil. He may hold an unyielding and archaic view of himself without ability to mobilize intelligence for creative and productive action.

These distressing and major emotional problems should be expected in young gifted children in a frequency which is only slightly less than that for the normal population. The inception of problems and of personal soundness is early. *Success calls for good homes and highly skilled counselors in the elementary school.* The counselors needed are not test-givers and record-keepers but highly trained, sensitive persons who can help parents and assist in the re-education of emotionally handicapped children. The possibilities of success are enhanced by the child's natural ability to use language and symbols in his attempt to understand his feelings or re-establish his controls. With a skilled and impartial counselor, disturbed bright children are capable of formulating and internalizing solutions which will free them to start again on the road to maturity. Unfortunately, trained counselors are often thought to be appropriate only in high schools and colleges.

When gifted children are maladjusted, the loss of imagination and intelligence is vital to society. The majority of gifted children are like Nancy, able to examine why certain modes of behavior which seemed natural to Pocahontas would be so uncomfortable to themselves, able to revise their self-concept in light of an ideal from history, and able to bring language and creativity into play as they seek to understand character and develop values.

We must conclude that brightness implies a large empathic or feeling range. Because intelligent persons perceive readily, comprehend feelings, and have a rich store of experience, they participate actively in emotional states. They are receptive to physical and social stimuli and they have extended contact with happiness and pain. They are influenced by the emotional states around them and they respond to parental difficulties and to parental standards.

The problems of leadership and social acceptance

It has been a continuing hope that education will equip gifted children for social usefulness. Modern schools accept the challenge not only to provide sound academic education and the development of reasoning but to assure that gifted people should realize and accept their social obligations to their fellowman. Schools have aimed especially at the growth of leadership. Their efforts have been viewed with extreme skepticism by those who believe that gifted people are ill-fitted for any kind of social leadership.

The general record favors the educator's view. Studies of gifted children show more leaders among them than among average children. This should be expected since observations of gifted children indicate that they are marked by integrity, sympathy, responsibility, and other characteristics expected in leaders. They possess the physical characteristics and the attractiveness which have been found in most historic cases of leadership. They are larger than their age mates, conspicuously fluent, daring, vital, and able to estimate the facts in a situation.

Occasionally, the natural leadership advantages of giftedness are diminished by very great acceleration since it is unlikely that the youngest and the smallest member of a society will be elected to the central position of authority. Under ordinary circumstances, however, the ability to perceive group needs and the capacity to solve problems enables the gifted child to take the role of one who integrates the various capacities of others into an effective and functioning whole. Gifted children fall most naturally into leadership in intellectual and creative undertakings. Parents and teachers are responsible for providing opportunities which assure this many-faceted growth.

It is unnecessary to assume that each person with ability must be a recognized leader but it is proper to provide the minimum learnings which make his leadership possible. Some of these learnings are socio-emotional; being able to sense responsibility, give affection, show agreement, and encourage.[10] Other learnings are skill-like. They include the skills of presenting, discussing, organizing, and following parliamentary procedure. All of these learnings are important in achieving the purposes which are served by group life. In a democracy, the school must arrange opportunities to acquire the skills and feelings involved in leadership and in social behavior.

Some writers maintain that intelligent children are handicapped by the jealousy of average persons. They hold that handicaps are placed in the way of the intellectually competent child so that he is caught in a continuous struggle to vitiate jealous reactions or to overcome jealous barriers which surround him. Probably these are unwarrantedly strong opinions though jealousy becomes a major factor if the child is socially exploited by his parents or by the school. More important, the gifted child cannot have a correspondence of experience which is one of the easiest bases for mutuality of understanding. It is likely that he will be misunderstood by those who do not perceive the elaborate structure of events and knowledges which produce the complex opinions or the unusual behavior which are characteristic of him.

In some respects gifted children have interests and behaviors which resemble those of chronologically older and mentally equal children while in matters of a more physical kind they tend to have interests more nearly approximate to their chronological age and experience. They often choose play companions and play activities for which they are short on physical skill. Disparity between chronological age and mental age or between physical development and intellectual development makes them uncomfortable and dissatisfied with their own age mates but unable for competition with older children. The combination of factors results in confusions with respect to the problems of age and size. It results, also, in some natural self-criticism which may well lead to considerable unhappiness.

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[10] Robert F. DeHaan, "Social Leadership," *Education for the Gifted: 57th Yearbook of the NSSE, Part II* (Nelson B. Henry, Ed.), Chicago, University of Chicago Press, 1958, pp. 127–143.

The problems of unequal development tend to be overestimated. The gifted child is generally advanced in physical growth and his ingenuity increases his capacity to participate with children who are chronologically older. Witty and Lehman matched fifty children with IQs above 140 with average children and found these subjects to be versatile in play interest though there was some tendency to avoid competitive and physically vigorous activity.[11] This avoidance should not be attributed to failure or disappointment. In part, it results because alert and imaginative children are more capable of enjoying quiet activities. The path which leads to loneliness and isolation is much less attractive than the one which leads to social activity and social success at any age. Only when family and community fail is there probability that gifted children will indulge in unhealthy solitariness.

An appraisal of adjustment level for gifted children cannot be undertaken without some agreement on the desirability of gregariousness. Western culture values social activity but fails to distinguish between social dependence and social maturity. There is a tendency to believe that the well-adjusted child must always turn to others for enjoyment and for learning. The gifted child does not do this. He spends more time in both solitary play and social activity than do other children for he works more rapidly and has greater freedom. As a rule he does not wait for something to happen, he employs himself with enthusiasm and with direction as a member of the group or alone.

Ideal conditions for developing leadership and social maturity provide for range and variety. Nancy and Kathy live on a farm, where whole families visit together and they participate in play and conversation with older as well as with younger children. Since their first school experience was in a small school, many of their activities, particularly at play, were not tightly controlled by age classifications. Their environment has provided a range of tasks suited to their social and emotional development. They have had a chance to compete and participate in intellectual activities appropriate to their levels without being denied opportunities to participate in childish activities appropriate to their physical growth and sometimes to their social experience. They have not been limited by narrow administrative units or by an overorganized society. Their personalities mature rapidly and they enjoy numerous leadership roles.

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[11] Paul A. Witty and Harvey C. Lehman, "The Play Behavior of Fifty Gifted Children," *Journal of Educational Psychology*, 18, No. 4, April 1927, pp. 259–265.

Conformity and discipline

It is often believed that highly intellectual functions are disorderly and undisciplined. Artists and gifted children are presumed to be temperamental, indifferent to public opinion, and self-centered. Empirical evidence discounts this idea. Truly gifted men of all ages, men such as Pasteur, have been tractable and devoted to goodness. Some gifted children are unreasonable but most are patient, conforming, and concerned for the welfare of others. Disregard for popular views and a rejection of social conformity is sometimes proposed as a device to promote creative intelligence. While it is true that integrity with intelligence must sometimes lead to rejection of popular choices, the same qualities must often lead to acceptance of common practice. The most intelligent person will recognize that he frequently knows no better way.

Gifted people have a fund of psychic energy and little fear of complex or turbulent ideas. They are challenged by the unfinished or the misunderstood. These interests lead some of them into topics which involve conflict and anger. They also have an intense interest in philosophy and may develop positivistic attitudes which lead to differences of opinion. The unwholesomeness in these situations comes less from the conflict than from the attempts to control the child's relationships. Gifted children are naturally excited with the wonders of life and they need chances to discover and discuss. They should not be required to abandon each conviction for the sake of peace.

It has been feared that persons capable of mastery may become assertive and aggressive. Goddard thought the establishment of a special program in Cleveland might cause gifted children to become conceited and take serious discipline problems forward to the high school.[12] Several authorities argue that the greater equality in these classes eliminates rather than fosters problem behavior. It seems probable that the special or regular class is not the issue. The major factors are attitudes of people who surround the child. From a mature example he learns both reasonable conformity and essential integrity.

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[12] Henry Herbert Goddard, *School Training of Gifted Children,* Yonkers-on-Hudson, World Book Co., 1928, p. 110.

Gifted children are generally able to meet expectations and find a welcome in the group. However, they are challenged by the truth and they are likely to hold convictions in the face of social pressure or conflict. They are filled with urgent curiosity, excited enthusiasm, bubbling impatience, and unexpected invention, which may lead them away from the organized lesson. When parents or teachers interpret these behaviors to be uncontrolled, threatening, or undisciplined, the problem lies more with the adult than with the child.

Underachievement and work dissatisfaction

A San Diego study of adjustment shows underachievement as a problem for 8 per cent of elementary and 15 per cent of secondary gifted children.[13] Most studies report higher incidence from 9 per cent to approximately 40 per cent.

Underachievers among intellectually able students are marked by inadequate work habits. College students in this category have attributed their failures to poor study habits brought forward from elementary grades. Narrow and non-challenging curricula contribute to narrow interests, indolence and desultory or disorganized habits. These conditions reduce motivation and under them, even motivated students apply themselves to inconsequential matters with meticulous attention and acquire perfectionism in superficial matters.

Superior intelligence does not make effective work habits less desirable. Suitable habits are most likely to be learned in a curriculum which is adequately challenging either because it is enriched or because the student has been accelerated. When it is not challenging the gifted student is capable of intellectual invention. This leads to daydreaming which is found to be the principal escape from boring and routine tasks.[14] A suitable program provides time for quiet and thought but it does not insist on idleness.

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[13] Helen W. LeHew, "Some Psychological and Psychiatric Findings on Gifted Students in San Diego," mimeographed, p. 7.

[14] Jesse A. Bond, "Analysis of Factors Adversely Affecting Scholarship of High School Pupils," *Journal of Educational Research,* 46, No. 1, September 1952, pp. 1–15.

Studies of underachievement lead almost invariably to the conclusion that personality and attitudinal factors are central in the failure to use ability. One study which compared high achievers with low achievers in order to discover items predictive of failure found that the most indicative ones were those characterized as "psychiatric and familial." [15] The significant items were related to the nature of maternal discipline, the security of the mother's personality, historical relationships in the family, the nature of the family relationship, and discipline. The concentration of these factors occasions no surprise since it is widely conceded that failure is associated with emotional problems except where ability is inadequate.

Similar conclusions were reported from England in 1950 where underachievement was related to emotional and social influences which interfered with mental function.[16] An Ohio study of eighth-grade children shows that factors which are statistically predictive of underachievement include emotional conflict, dependence, submissiveness, immaturity, and lack of achievement satisfaction.[17] In 1957, Gowan wrote a very useful summarizing review of studies done with underachieving gifted children.[18] He pointed out that an achieving pattern was established in the elementary school. Failing that, the child ordinarily continued underachieving.

Some writers propose that achievement patterns develop in an "industry stage" which coincides with early latency. This is consistent with the earlier recommendation that the upper elementary school should be marked by an explosion in scholarship with a sense of success tied to very accurate outcomes in academic fields. Children who do not succeed in this period may fall back into more primitive behavior. Since boys are proportionately less mature and since adults sometimes set higher standards for them, it seems likely that problems will be more numerous with boys than with girls.

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[15] Agnes M. Conklin, *Failures of Highly Intelligent Pupils: A Study of Their Behavior by Means of the Control Group*, New York, Bureau of Publications, Teacher's College, Columbia University, 1940.

[16] Harry Edelsten, "Education Failure with High Intelligence Quotient; A Clinical Study," *Journal of Genetic Psychology*, 77, 1st half, September 1950, pp. 85–116.

[17] R. Bishton, "Study of Some Factors Related to Achievement of Intellectually Superior Eighth-Grade Children," *Journal of Educational Research*, 51, No. 3, November 1957, pp. 203–207.

[18] John Curtis Gowan, "Dynamics of the Underachievement of Gifted Students," *Journal of Exceptional Children*, 24, No. 3, November 1957, pp. 98–101 and 122.

Data from some of the studies support the conclusion that underachievement for the gifted is a kind of social behavior or intellectual delinquency. These children insulate themselves from academic endeavor. Some members of minority groups and lower social classes withdraw because the outcomes of academic learning are alien to their interests and not vocationally rewarding. Other children seem to reject achievement in response to parental attitudes about education. It appears that some parents are too eager and anxious for the child's success. Others are oversolicitous for the child's immediate pleasures and some are inconsistent in their demands. Achievement is a complex response and appears to be associated with a strong sense of personal identity, sensitivity to others, social effectiveness, self-confidence, reading and arithmetic skills, orderly habits, clearness of goals, stable family relationships, family demands for superior performance in most fields, and a sense of personal maturity (especially within the family).

The Horace Mann–Lincoln Institute's Talented Youth Project has had a continuing concern with the underachiever and has studied both conditions which produce failure and conditions which increase effectiveness.[19] Academic underachievement is found to be symptomatic of more basic personal-social problems. In many of their family conditions, the unproductive students are not unlike the successful ones, but a major difference is that fathers are much more frequently absent from the home, either through death or divorce. Children failing to achieve their potential recognize their own ability but they anticipate limited success and resist making the effort necessary for full achievement. The study finds very great differences among underachievers. While personal and family conditions are involved it cannot be assumed that one set of conditions mark all or any large portion of the unsuccessful group. The children who improved during the experiment were first, those able to identify with a teacher who was consistently supportive, interested, and able to accept them as individuals in need of special help and, second, those who received assistance in mastering the skills of learning, characteristically inadequate among underachievers.

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[19] A. Harry Passow and Miriam L. Goldberg, "Study of Underachieving Gifted," *Educational Leadership*, 16, No. 2, November 1958, pp. 121–125.

When the gifted student is underachieving the school should look at the challenge of the program, the adequacy of basic learning skills, and the emotional condition of the learner.

Developing a point of view

The child who has ability to understand and organize is motivated to find orderly and reasonable explanations for his world. That search is prolonged and difficult. He encounters disjointed values and philosophies which have been assembled in hurried and piecemeal fashion. He finds that beliefs are often selected for their practical usefulness more than their soundness or logic. Accepted ideas often come ready-made from large communication media and are popularized by a sales-pitch. Emphasis on immediately useful and popular ideas means that substantial achievement may pass unnoticed while minor contributions achieve a noisy reputation.

The search for values is inescapable. Ideas and beliefs exert influence over each lower level of response. They play a particularly dominant role in the behavior of the gifted child. He perceives the implications of his acts and he relates his current experience to abstractions and rules. His code comes more from judgment and less from habit. For him, abstract and philosophic learnings are both easy and practical but they are not fortuitous. They must be cultivated. Inadequate opportunities for interpretive learning may lead to lifelong anxieties and must certainly reduce the potential of intelligent children.

The gifted child does not suddenly become well articulated and independent. Impelled by unusual perceptions and creative understanding he chooses tasks which are difficult and which may seem unimportant to his contemporaries. Failure to achieve these goals or failure to be appreciated for achieving them may lead to feelings of inferiority, isolation, and depression. It seems likely that those who set the farthest goals may suffer the largest defeats. On this point Aristotle concluded, "All men of genius are said to have suffered from melancholy, but melancholy is the expression of profound and unsatisfied yearning." Feelings of rejection and unhappiness may grow in the child who is unchallenged, who is assigned routine and insignificant tasks or who chooses goals which are outside the aspiration level of his fellows.

The child's problems are not unlike adult problems. Urban and industrial conditions standardize work and reduce the satisfactions which accrue from truly creative performance. Many workers have only a money relationship to their work and they relinquish responsibility to the corporation or the union. With the loss of personal involvement work seems insignificant and psychologically fatiguing. Adults transfer their enthusiasm to leisure pursuits. The gifted child in the large departmentalized school faces similar problems. He is profoundly earnest and devoted to learning but he must restrain himself to a group pace and to group endorsed opinions. He works at less than capacity and pursues objectives which have limited significance for him. The waiting and the inhibition of zeal are disillusioning and discouraging.

The gifted child seeks complex answers to questions not yet recognized by his age mates. He searches to solve the problems of origin, death, and philosophy when neither the school nor the parents are prepared to answer. There is a general conviction concerning the age at which these questions are appropriate. The child proposes them outside the anticipated pattern and adults may avoid them or refuse to answer. The gifted child's progress is inhibited and he withdraws from emotional and philosophic learning. He may well become infantile and depend on adults for all his judgments or he may become negativistic and reject adult judgments.

Home and school cannot choose a most-wanted development rate. They must inhibit exploration when it is dangerous because the child is physically or socially immature. The best course is to stimulate growth in another area. As a general rule it is safer to push growth in the academic and skill areas than in the social and emotional areas. While it is natural for the gifted child to investigate all vital questions before his age mates, adults may most wisely encourage rapid development in mathematics, manual skills, chemistry, and other basic learning. Both the understanding in these matters and the self-dependence acquired will assist the child in meeting the socio-emotional problems as they arise. In the whole process the gifted child needs the support and counsel of adults.

One is tempted to wish for a good teacher and a one-room country school where the child may participate in a wide range of activities with close human contact. Such an environment, devoid of commercial entertainment and filled with chances to read and talk, would be almost ideal. In the absence of the ideal, schools should have small classes, homeroom organization, ungraded primary classes, fluid promotion, and teachers who are thoughtful and accepting. Above all, the children need opportunity to think and talk about their values.[20]

The gifted child is severely handicapped if the family gives love only in return for achievement. He draws his first standards and his first concept of self from the home and primarily from the mother's evaluation or feelings toward him. If the mother's feelings arise from parental ambition and if her objectives devalue thought in favor of simple success the child is thwarted in his search for mature independence. He must reject the parental goals or succumb to the role which is set for him. All of the adults must be sensitive to the uncertainty which accompanies maturing insight. In the following poem an adolescent boy describes his concern for philosophic questions, but voices, also, uncertainty and a fear that cowardice will claim him when his beliefs are challenged.

So Long

I am alien to all that you call yours, my friend,
So I must leave.
Close the door gently behind my back,
And return to your desk:
Work on with wrinkled eyebrows . . .
I will go out by paths I do not know
Away from you;
And I shall not look back,
For I shall be afraid.

They are too sure, those gods of yours,
I, who am a weather vane,
Must leave your windless room.
Close the door gently behind my back
And resume your thoughts;
But, first, turn the key—
For I shall be afraid.

James Flexner[21]

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[20] G. C. Myers, "Parents and the Gifted Child," *Education*, 79, No. 1, September 1958, pp. 17–18.

[21] "So Long," by James Flexner, from *Creative Youth*, by Hughes Mearns. Copyright 1925 Doubleday & Company, Inc. Reprinted by permission.

The record proves that the majority of gifted children meet personal and social problems with intelligence. They are marked by curiosity and insight; they are tall and healthy; they are muscular and reach pubescence early; they are widely read and vocationally successful; they have many interests and few dislikes; they marry, have children and social success; they are infrequently involved in crime, mental illness and failure; they are moral and useful. Their histories are marked by both genuine achievement and tremendous unrealized potentialities.

The road to self-realization and creative maturity is beset by some problems which are unique to gifted children. However, intelligence is a tool suited to revising, organizing, and understanding the self and the surroundings. Gifted children meet impediments with amazing resilience and this is one of the truest marks of their brilliance. They persist because they can estimate remote consequences, because they have a vivid and accurate picture of themselves and because they understand the value of what they do.

Stewardship of the Bright

An increasingly complex civilization becomes ever more dependent on the utilization of superior intelligence. The development of a more generous society and a more stable culture requires insight and enthusiasm from the ablest citizen. Preparation for this assignment is a challenge of immense proportions—a challenge both to the home and to the school.

Society is not disinterested in the use of intelligence though sometimes it appears unwilling to face the truly human qualities of gifted people. Creative intelligence is not developed through robot education and noble outcomes are not encouraged by schools that are rigid, boring, and threatening. There is a widespread belief that high intelligence is best served by an education which is simply rigorous and academic. This is erroneous. Such an education is anti-intellectual, overconcerned with accumulation of successive facts, and short on activities which produce wisdom and desirable motivations.

Equally faulty is group-directed education with goals of conformity to either group values or the status quo. Such an education has slavish enthusiasm for group process and immediately useful achievements. It prescribes waste and boredom for the gifted child and it submerges the ego-image which is so essential for enthusiastic and creative work.

Education suited to gifted children actively pursues emotional and character development, aware that an inherent relationship exists between intellectual growth and emotional welfare. Fear, discouragement, and dread are the prelude to individual and social disaster. Discouraged and frightened persons become rigid, freeze at the switch, and lose their intellectual function. With fear, gifted persons relinquish their distinctiveness. Their behavior more closely approximates that of the dull or average. The distance between giftedness and dullness is greatly diminished by fear, with both persons responding much as frightened animals respond—either very swiftly or very slowly, in repetitive and non-adaptive ways.

Undoubtedly, a few gifted children live in conditions of hate and neglect where hope is unrewarded. A larger number are denied the opportunity to act at full capacity, to accept responsibility or to think in creative fashion. In either case they could feel defrauded and bitter and they are unlikely to engage in activities which are useful to their fellows. Parents and teachers who guide the gifted ones (unhappy or not) must themselves be mature in character and strong in giving and receiving love.

Highly successful work with handicapped children over the last third of a century causes guidance workers and students of behavior to reject very static views on intelligence and personality. They concentrate less on measuring defects or helping the person to find his level and settle into it, and emphasize instead the enlargement of horizons and the development of personality.[22] There is less concern with the traumatic and dramatic incident for it is the prosaic day-to-day events which account for the major increments in the productive and well-disciplined personality.

Observations of gifted people remind us again and again that they are marked by variability, that two gifted persons differ more from each other than two persons who are similar on any other basis. Their variability arises from their creativity and from the capacity for discovery, and it enters into the feelings which are brought to intelligent discontent or to thoughtful optimism. Their uniqueness makes it impossible to prescribe one curriculum, one method, or one activity which is "right" for all gifted people.

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[22] Arthur W. Combs, "Adjustment, Through Guidance and Special Services," *Educational Leadership*, 16, No. 2, November 1958, pp. 89–92.

Good guidance does not seek to make everyone alike; it seeks to provide conditions under which individuals may achieve optimum development. Good education liberates brilliant students to give sense and order to their own lives while contributing their ingenuity, imagination, and wisdom to the group welfare. It is impossible to ignore the non-intellectual factors and the fears which limit the trust of self and others. Fearful persons withdraw from discovery and prejudiced persons are unable to examine generous alternatives. The liberation of intelligence involves freeing the child to examine alternatives, to discover or select a way, and to maintain behavior appropriate to a responsible goal. These are qualities essential in democratic behavior.

Happiness for Stephen, Nancy, Kathy, Pete, and thousands of other gifted children is closely allied with human welfare. Emotional development underlies the courage needed to examine what is good and right and the willingness to do it.

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